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Vessels Lost During 1896.

A SEASON OF PROFIT FOR THE UNDERWRITERS—EARNINGS ARE PROBABLY LARGER THAN DURING ANY PREVIOUS YEAR—NO BIG LOSSES.

The navigation season of 1896 has been a fortunate one for lake underwriters. Their losses on steel vessels due to stranding and collision in the connecting channels have not been heavy, when compared with the losses of the past two seasons, and especially in view of the increase in the number of vessels of this kind, while the total losses are confined almost entirely to low-grade vessels of the smaller class, on which there was in most cases no insurance of any kind. Only such vessels as are total losses in the real sense of the word—vessels that have passed out of existence—are included in the table that appears on this page. The summary shows a total of thirty-five vessels, of 21,425 net tons capacity and valued at \$386,500. In 1895 the number of total losses was sixty-three, and the vessels were valued at

Leading to Big Exports in Iron.

Within the past few days a contract has been entered into between John D. Rockefeller and the Carnegie Steel Co., whereby Mr. Rockefeller is to supply the Carnegie Co. with large quantities of iron ore, to be produced from his mines, moved over his ore railway to Duluth and thence by vessels of the Rockefeller fleet to Lake Erie ports. The contract is to run for a number of years and is undoubtedly of more importance to the iron ore and vessel industry on the lakes than any of the big deals that have taken place in late years.

Although the details of this transaction are meagre as yet, its significance is fully understood by leading men in the iron industry. It means, first of all, that Mr. Rockefeller has no intention whatever of entering into the manufacture of iron or steel, even to the extent of making pig iron, but he has already taken up business relations with Mr. Carnegie that will assist in enabling the big Pittsburg steel

TOTAL LOSSES ON THE LAKES DURING 1896—VESSELS THAT ACTUALLY PASSED OUT OF EXISTENCE.

NAME OF CRAFT.	TYPE OF CRAFT.	CAUSE.	DATE.	WHERE.	CAPACITY, NET TONS.	VALUE.	OWNED BY.
Dalton, Peter	Tug.....	Burned.....	April 12.....	Lake Huron.....	.....	\$ 6,000	Independent Tug Line, Chicago.
Ayer, Mary D.....	Schr.....	Collision.....	May 17.....	Lake Michigan....	600	4,000	F. F. Ayer, Chicago.
Sunrise.....	Schr.....	Collision.....	May 21.....	Lake Michigan....	750	4,500	H. Scheele, Sheboygan.
Williams.....	Stmr.....	Foundered.....	May 28.....	Lake Michigan....	150	5,000	Capt. LeClair, Two Rivers.
Canfers, R.....	Schr.....	Stranded.....	June 1.....	Pilot Island.....	350	1,500	Capt. Peter Blake, Muskegon.
Hodge, S. F.....	Stmr.....	Burned.....	July 5.....	Lake Ontario.....	900	20,000	Farrell Bros., Buffalo.
Little Wissahicken.....	Schr.....	Foundered.....	July 10.....	Lake Erie.....	600	3,000	Geo. McKay, Bay City.
Walbridge, H. S.....	Schr.....	Stranded.....	July 15.....	Lake Erie.....	450	1,000	J. Blair, West Bay City.
*Clark, James.....	Tug.....	Burned.....	Aug. 19.....	Owen Sound.....	.....	4,500	J. Craig, Collingwood.
City of the Straits.....	Schr.....	Burned.....	Aug. 25.....	Ontonagon.....	750	3,000	J. E. Mills, Port Huron.
Marsh, P. S.....	Schr.....	Foundered.....	Aug. 25.....	Lake Superior.....	1,000	10,000	Joe Deville, Cleveland.
Granger.....	Schr.....	Stranded.....	Aug. 25.....	Lake Michigan....	600	3,500	Capt. Wm. Powers, Chicago.
Elsworth, Col.....	Schr.....	Collision.....	Sept. 2.....	Straits.....	600	2,500	C. A. Chamberlain, Detroit.
Baltic.....	Stmr.....	Burned.....	Sept. 5.....	Collingwood.....	.....	15,000	Great Northern Trans. Co., Collingwood.
Knapp, Gilbert.....	Schr.....	Stranded.....	Sept. 7.....	Lake Michigan....	550	2,500	.....
Pelton, J. R.....	Schr.....	Stranded.....	Sept. 15.....	Lake Erie.....	450	1,500	Kelly Island Lime Co., Cleveland.
Macy, David.....	Schr.....	Collision.....	Sept. 21.....	Lake Erie.....	400	1,500	Cutler and others, Spring Lake.
Cottrell, Harry.....	Stmr.....	Foundered.....	Sept. 28.....	Lake Erie.....	125	2,000	Capt. Geo. Phelps, Marine City.
Sweepstakes.....	Schr.....	Stranded.....	Sept. 29.....	Lake Erie.....	700	1,000	T. Fish, Port Huron.
Sumatra.....	Schr.....	Foundered.....	Sept. 30.....	Milwaukee.....	1,400	15,000	Alvin Neil, Port Huron.
Loretta.....	Stmr.....	Burned.....	Oct. 8.....	Black River.....	600	10,000	Herman Endress, West Bay City.
Pacific.....	Schr.....	Foundered.....	Oct. 13.....	Lake Erie.....	600	2,000	L. P. & A. J. Smith, Cleveland.
Australasia.....	Stmr.....	Burned.....	Oct. 18.....	Lake Michigan....	2,200	85,000	James Corrigan, Cleveland.
Grand Traverse.....	Stmr.....	Collision.....	Oct. 19.....	Lake Erie.....	900	30,000	Lackawana Trans. Co., Buffalo.
Ely, S. P.....	Schr.....	Stranded.....	Oct. 29.....	Lake Superior....	1,300	10,000	M. A. Bradley, Cleveland.
Allegheny.....	Stmr.....	Stranded.....	Oct. 29.....	Lake Michigan....	600	10,000	Tonawanda Barge Co., Tonawanda.
Transfer.....	Schr.....	Stranded.....	Oct. 29.....	Lake Michigan....	600	3,500	Tonawanda Barge Co., Tonawanda.
*Acadia.....	Stmr.....	Stranded.....	Nov. 5.....	Lake Superior....	800	25,000	Mackay Bros., Hamilton, Ont.
Waukesha.....	Schr.....	Stranded.....	Nov. 8.....	Lake Michigan....	600	2,500	F. H. Head, Chicago.
Senator Blood.....	Schr.....	Stranded.....	Nov. 11.....	Straits.....	475	2,000	T. H. Cahoon, Cleveland.
Brenton.....	Schr.....	Stranded.....	Nov. 13.....	Lake Erie.....	50	1,500	Geo. Albright, Cleveland.
Johnson, L. B.....	Tug.....	Coll's'n,tow-line	Nov. 13.....	Lake Michigan....	.....	7,000	Dunham Co., Chicago.
Arnold, B. W.....	Stmr.....	Burned.....	Nov. 22 ..	Lake Superior....	1,400	45,000	Mills Trans. Co., Port Huron.
Success.....	Scow Schr..	Stranded.....	Nov. 26.....	Lake Michigan....	75	1,000	A. L. Olson, Manitowoc.
City of Kalamazoo.....	Stmr.....	Burned.....	Nov. 30.....	South Haven.....	850	45,000	Williams Trans. Co., South Haven.
Number of total losses, 35.					21,425	\$386,500	

*Canadian.

\$1,290,100 and capable of carrying 48,975 net tons. The list of total losses during 1896 includes no steel vessels, and really only one valuable wooden vessel, the Australasia, which was burned on Lake Michigan in October. The City of Kalamazoo, a passenger steamer of considerable value, which was burned at South Haven Nov. 30, will very probably be rebuilt, and there was some doubt as to the advisability of including her in the list. With a season of losses so light, supporters of the home companies will think it unfortunate that so much of the insurance business has gone to English underwriters. The result will probably be more of a tendency on the part of the home companies next season to meet the liberal policy and low rates of the foreigners. As compared with previous years, the total losses of 1896 were as follows:

	1896.	1895.	1894.	1893.
Number of vessels.....	35	63	54	65
Capacity, net tons.....	21,425	48,975	31,415	41,625
Value.....	\$386,500	\$1,290,100	\$522,750	\$1,172,200

concern to produce iron and steel at prices that have up to this time been unthought of in the industry. It means also that the Carnegie company, through this transportation deal, in connection with its Conneaut docks and railway, and in view of its interests in cheap fuel, is about to lead a reduction of values along the whole line of steel products that must result, a little later on, in an immense export business from this country.

About \$10,000 will be spent during the coming winter on ore dock No. 4 on the Lake Shore side at Ashtabula, which has been known as the Superior dock, and which was recently leased in the interest of J. D. Rockefeller. Machinery on this dock which will be improved consists of a Brown hoist of six legs, six McMyler rotary hoists and six hoists made by the Variety Iron Works of Cleveland.

A Washington dispatch announces that Capt. Robley D. Evans, U. S. N., has been relieved from command of the battleship Indiana and ordered to Washington as a member of the light-house board.

A Few Notes in Review of the Season.

A letter reviewing briefly the business of the lakes during 1896, and dealing also with the Lake Superior ore industry, has appeared in several leading daily newspapers throughout the country within the past few days. This letter was prepared jointly by the editors of the Iron Trade Review and Marine Review of Cleveland. Some extracts from it are presented herewith:

"The expiration of insurance on all lake vessels today (Thursday) marks the close of a season that has been remarkable in many respects, not least of which is the evidence that the business is drifting into strong hands—into the hands of capitalists who will be satisfied with moderate returns on big investments. Within the year, a fleet of sixteen big steel vessels, valued at \$3,000,000 and capable of moving about 1,400,000 tons of ore from Lake Superior to Ohio ports in a single season, have been built and equipped for John D. Rockefeller, whose interests in iron mines, railways and docks, acquired some time ago, now represent a combined capital almost equal to that of the Minnesota Iron Co., which is the largest corporation engaged in producing iron ore in this country. Mr. Rockefeller is now letting contracts for more vessels of the largest type. And yet it is more than probable that the chief of the Standard Oil Co. has not as yet seen any of these mines or ships. He has had no direct dealings with any of the men who have sold him mines or built vessels for him. The business was all arranged by F. T. Gates of New York, who is a trusted lieutenant in big enterprises, and when it became necessary, early in the season, to select someone to manage the vessels, Mr. L. M. Bowers was sent to Cleveland from New York. Mr. Bowers has also been in the Rockefeller employ for a number of years.

"This step on the part of Mr. Rockefeller indicates the extent to which men of big resources, and corporations equally powerful, have taken charge of the lake trade. The vessels of these big owners, which are all of the very largest type, have made money during the season, notwithstanding great depression in other lines of business, but the smaller class of wooden craft have been operated without profit, and the future has even less in store for them than the experience of the past season.

"Just before the opening of navigation last spring, the prospects of an active iron market had elevated the ideas of vessel owners regarding the season's business. Stocks of iron ore on Lake Erie docks and at furnaces were not large, and the dealers in Bessemer ore had united in a demand for prices that would insure a liberal profit. The great depression in business that followed throughout the summer and up to the close of the presidential campaign was unthought of. Basing their ideas of the year's business and the results in previous years when stocks were low, the ore dealers made contracts with vessel owners for quite a large amount of tonnage running throughout the season at \$1.05 from the head of Lake Superior, 95 cents from Marquette and 70 cents from Escanaba to Ohio ports. It was fortunate for the vessel owners that these contracts were made, as it now turns out that the average rate earned by vessels which had no ore contracts were only 77 cents from the head of Lake Superior, 66 cents from Marquette and 52 cents from Escanaba. At times during the season the smaller vessels were tied up in large numbers, having nothing to do. Rates of freight reached the lowest points that have ever been recorded in the history of lake commerce. The average rate on wheat from Chicago to Buffalo for the season was only 1.7 cents a bushel, and from Duluth to Buffalo it was only 2.2. Anthracite coal, which is moved in large quantities from Buffalo to Duluth, has paid the vessels only 24 cents a ton, although the distance is but little short of 1,000 miles. On about 2,600,000 tons of soft coal moved from Ohio ports to Lake Superior, the average rate has been only 29½ cents. It would hardly seem possible that ships could make a profit at such rates of freight, but the secret is in big cargoes, low operating expenses and machinery that permits of a vessel of 5,000 net tons capacity being loaded in a few hours and unloaded in a little more than a day. Then, too, it must be noted that in the season's business the contracts referred to above had much to do with evening up earnings, and that only the big ships can be said to be capable of carrying freight at these average rates.

"Notwithstanding the low freight rates and the fact that some of the smaller vessels were in ordinary during the summer, the season's record of shipments will again show big gains over all previous years in all lines excepting iron ore, and even the ore product does not show much of a loss, as the total is in round numbers 9,900,000 gross tons,

against 10,400,000 tons in 1895, which was the greatest year known in the industry. This great movement of freight with some vessels idle is explained by the increase in capacity of new lake carriers and by the greater depth of channels, due to progress of the project for a 20 foot waterway throughout the lakes. Commerce passing the city of Detroit this season will aggregate 32,500,000 tons, or a gain of nearly 3,000,000 tons over 1895; receipts of grain and flour at Buffalo alone (flour included as grain) will exceed 200,000,000 bushels, and the coal shipments from Lake Erie to upper lake ports (anthracite and bituminous coal) will be a little above 7,000,000 net tons. But the greatest gains will be in Lake Superior business, where the St. Mary's Falls canal figures, prepared by officials of the war department, show a freight movement exceeding 16,000,000 tons, which is about a million and a half tons in excess of 1895, three million tons in excess of 1894, and full five million tons greater than the shipments of 1893."

Iron Ore Business of 1896.

Following are some extracts from the letter referred to in the first paragraph of the article just preceding on this page:

"The achievements of the infant Mesabi range that has come so quickly to be the giant of all the ranges, so far as output is concerned, have had the critical attention of old-range mining men in the last three years. In 1895 the Mesabi shipped 2,781,587 tons of ore; for 1896 the total will run about 100,000 tons more. Two and three years ago the only considerations that seemed to weigh with owners of newly developed properties on the Mesabi were the low price at which they could produce and the enormous quantities their steam shovels could put on the market. The last year has convinced these men that there is another question of vital importance, namely, how much Mesabi ore will the market take? The Carnegie Steel Company's interest in the Oliver mine insures an output of close to 1,000,000 tons of that ore next year, and the Biwabic mine, on account of its low phosphorus ore and its connection with blast furnace interests, can readily find a market for all that it is allowed to mine. Other Mesabi mines, controlled by steel companies or blast furnace owners, are assured of an outlet for moderate tonnage. But the predictions that the Mesabi range with its 300,000,000 to 400,000,000 tons of ore reserves would crowd out the deep mine ores of the old ranges are finding no verification. The percentage of the Mesabi ores running less than .045 per cent. in phosphorus is very small. Phosphorus is the bete noir of the steel maker, and in the last year specifications for steel rails have been more rigid than ever as to phosphorus. Where railroads had specified .10 per cent. in phosphorus and tolerated .11 and .12, they called this year for rail steel not above .085 in that element. The result was that the Carnegie Steel Company and the Illinois Steel Company went into the ore market early and got the pick of the low-phosphorus ores of 1896 production. It turned out that the rail orders booked by these two companies were not enough to use up all these ores, but they proved a paying investment, since the buyers were enabled to mix with them a liberal percentage of cheap, higher phosphorus ores and thus produced a low-priced Bessemer pig iron for the manufacture of soft steel. There is but one important property on the Mesabi range that can furnish a large quantity of low phosphorus ores, and, if steel-makers continue to draw the line more strictly as to phosphorus, in making up their Bessemer mixtures, a number of mines on the new range will find their chief outlet in supplying the low-priced components of such mixtures. At the same time, the desirable low-phosphorus ores of the old ranges, such as the Pewabic, Lake Angeline, Aurora and Chandler and the choicest ores of the Minnesota mines on the Vermillion range, and the Lake Superior and Cleveland-Cliffs mines on the Marquette range, will find a readier market and more of a premium over the average Bessemer ores than ever before.

"A factor of some importance in this connection is the rapid increase in the past two years in the capacity of basic open-hearth steel plants in the United States. Last year the Illinois Steel Company added four 50-ton furnaces; Jones & Laughlins of Pittsburg built six 40-ton furnaces, and the Carnegie Steel Company is about to begin work on sixteen furnaces of 40 tons capacity each. At Sharon, Pa., and at Bridgeport, O., large plants are under way and others are projected by rolling mill companies who can not pay the Bessemer Steel Association's price for billets and compete on finished material with the big producers who make their own steel. This drift toward basic open-hearth steel will prove a boon for the producers of Lake Superior non-Bes-

semer ores, who have had a hard time of it for the four-year period just passed, in which Bessemer steel-making has seen its greatest expansion in the United States. In fact, in the season just closed, non-Bessemer ores, on which there has never been any agreement as to price, have furnished a larger percentage of the ore shipped than in any year since 1890. To some this is an indication that the basic open-hearth furnace, which is not choice as to the phosphorus element of the material that comes to it, has begun to crowd the Bessemer converter. The prediction of a well-known American metallurgist that the open-hearth furnace would yet attend the funeral of the Bessemer converter, is suggestive in this connection. It is too early to speak with definiteness about the iron market for 1897. A recent meeting in Cleveland of the members of the Bessemer Ore Association talked over the business of the last season, took account of stocks on dock and discussed the outlook for the next year. It is said that prices of Bessemer ores have not yet been considered. The ore men want to see how business opens up in the new year. They lost money in 1893 and 1894, and scarcely came out even in 1895, while 1896 has fallen short of expected profits. If 1897 is to bring a large demand for steel, the ore producers want their share of the profits, but strange conditions may develop before another year's business is begun."

Steamboat Inspection Service.

A few advance notes from the annual report of James A. Dumont, supervising inspector-general of steam vessels, have been received from the Washington office of the steamboat inspection service. The report deals with the fiscal year ended June 30, 1896. The chief of the service renews his recommendation of last year for legislation authorizing the secretary of the treasury to divide local inspection districts into two or more such districts, with a board of local inspectors in each, when the work in any district may be more economically conducted in such manner, than it could by appointing assistant inspectors to the original board of inspectors, when the increased number of inspections requires additional help. The recommendations are also renewed in behalf of legislation to secure a nonpartisan service, and permanent tenure of office, except for incompetency, misconduct, or permanent physical or mental disability; and for legislation creating an assistant supervising inspector-general, to be appointed by the president by and with the consent of the senate, on account of the large increase of work in his office, such work having increased over 160 per cent. since 1876, making such appointment in the office of the supervising inspector general an absolute necessity, it is claimed; for the proper personal supervision necessary to carry out the objects for which the office of supervising inspector-general was created.

The personnel of the service at the close of the fiscal year consisted of 169 officers, clerks and messengers. The expenses were, for salaries, \$283,710.97; contingent expenses, \$67,468.20. The total number of annual certificates of inspection issued to steam vessels, foreign and domestic, was 8,297. The total number of certificates issued to foreign passenger steam vessels was 300; to domestic steam vessels, 7,997. The following table shows that more than one-third of the tonnage (foreign and domestic) inspected by the officers of the service is owned on the lakes:

CLASSIFICATION OF INSPECTIONS, TONNAGE AND OFFICERS LICENSED BY UNITED STATES INSPECTION SERVICE, ACCORDING TO THE SEVERAL DIVISIONS OF NAVIGATION DURING THE YEAR ENDED JUNE 30, 1896.

DIVISIONS.	Inspection of steamers.	Net tonnage.	Officers licensed.
Pacific coast.....	640	174,409.83	3,501
Atlantic coast	3,781	1,073,534.52	17,080
Western rivers.....	1,042	142,242.29	7,244
Northern lakes.....	2,227	739,120.85	9,046
Gulf coast.....	607	108,713.07	3,046
Total.....	8,297	2,238,020.56	39,917

It is estimated that during the year 600,000,000 passengers were carried on steam vessels, while the total number of accidents resulting in loss of life was only forty-two, and the total number of lives lost from various causes was 221; decrease in number of lives lost from previous year, 173. Of the total of 221 lives lost, sixty-eight were passengers and 153 belonged to the crews of the vessels.

The Review has excellent photographs of lake ships.

Increase of More than a Million Tons of Freight.

Reports of Lake Superior commerce to Dec. 1 are at hand, and the figures show, with the traffic for about two weeks in December estimated, that the total freight movement for the season will be about 16,350,000 net tons, or nearly 1,500,000 tons in excess of the freight moved during 1895. As explained in these summaries during the past three or four months, the increase is mainly in grain. Shipments of grain of all kinds eastward through the two canals at Sault Ste. Marie to Dec. 1 foot up 88,354,933 bushels, against 43,608,155 bushels on the same date a year ago, or a gain of 44,746,778 bushels, which is equal to a million and a quarter tons. Soft coal shipments to Dec. 1 aggregate 2,605,172 tons, which is 497,768 tons in excess of the shipments on the same date a year ago. Anthracite coal shipments are about 50,000 tons short of the aggregate on Dec. 1 a year ago. Summaries prepared from combined statements received monthly from the two canals are presented herewith:

MOVEMENT OF PRINCIPAL ITEMS OF FREIGHT TO AND FROM LAKE SUPERIOR.

ITEMS.	To Dec. 1, 1896.	To Dec. 1, 1895.	To Dec. 1, 1894.	To Dec. 1, 1893.
Coal, anthracite, net tons.....	394,210	445,277	526,460	3,008,120*
Coal, bituminous, net tons ..	2,605,172	2,107,804	2,264,314	
Iron ore, net tons.....	7,885,769	8,040,558	6,544,648	4,010,990
Wheat, bushels.....	62,062,571	42,817,076	34,495,882	42,290,267
Flour, barrels.....	8,609,998	8,615,347	8,738,906	7,295,141

The total movement of all kinds of freight, shown below, to and from Lake Superior to Dec. 1, 1896, is 16,097,880 tons. This is almost a million and a half tons greater than to Dec. 1, 1895, over three million tons greater than on the same date in 1894, and full five million tons greater than on the same date in 1893.

REPORT OF FREIGHT AND PASSENGER TRAFFIC TO AND FROM LAKE SUPERIOR, FROM OPENING OF NAVIGATION TO DEC. 1 OF EACH YEAR FOR FOUR YEARS PAST.

EAST BOUND.

ITEMS.	Designation	To Dec. 1, 1896.	To Dec. 1, 1895.	To Dec. 1, 1894.	To Dec. 1, 1893.
Copper	Net tons...	116,412	107,117	98,893	87,530
Grain, other than wheat	Bushels....	26,292,362	791,079	1,529,948	2,386,499
Building stone.....	Net tons....	17,731	24,326	21,417	19,426
Flour.....	Barrels....	8,609,711	8,613,197	8,738,123	7,291,281
Iron ore.....	Net tons....	7,885,769	8,040,558	6,544,648	4,010,990
Iron, pig.....	Net tons....	27,948	24,481	21,068	32,766
Lumber.....	M. ft. b.m.	683,386	738,294	718,938	578,499
Silver ore.....	Net tons....	240	100	412	2,470
Wheat	Bushels....	62,062,571	42,817,076	34,495,882	42,290,267
Unclassified freight.....	Net tons....	174,289	138,677	181,690	147,722
Passengers.....	Number....	18,475	16,537	13,869	9,244

WEST BOUND.

Coal, anthracite.....	Net tons..	394,210	445,277	526,460	3,008,120*
Coal, bituminous.....	Net tons..	2,605,172	2,107,804	2,264,314	
Flour.....	Barrels....	287	2,150	783	3,860
Grain	Bushels..	2,209	35,650	10,500	28,850
Manufactured iron..	Net tons..	93,359	74,976	36,107	56,846
Salt	Barrels....	237,515	271,997	237,561	225,130
Unclassified freight.....	Net tons..	343,895	315,469	268,903	262,808
Passengers.....	Number..	18,586	16,944	13,331	9,615

*Previous to 1894 anthracite and bituminous coal were not reported separately.

SUMMARY OF TOTAL FREIGHT MOVEMENT IN TONS.

	To Dec. 1, 1896.	To Dec. 1, 1895.	To Dec. 1, 1894.	To Dec. 1, 1893.
West bound freight of all kinds, net tons.....	3,475,792	2,934,646	3,032,134	3,392,190
East bound freight of all kinds, net tons	12,622,088	11,675,453	9,607,738	7,345,941
	16,097,880	14,610,099	12,639,872	10,738,131

The total number of vessel passages to Dec. 1, 1896, was 18,445 and the registered tonnage 17,144,385.

The traffic of the canals during November of this year was not, of course, equal to the traffic of November of 1895, as the great bulk of last year's lake business was crowded into the closing months of the season. In November, 1895, 1,611,020 tons of freight were moved through the canals and the registered tonnage was 1,673,896; for November of this year the figures are respectively 1,557,912 and 1,354,458.

Ship Yard Matters.

Ship builders are still figuring on more new vessels, and the list of seventeen big freight carriers, now under contract in the several yards around the lakes, will undoubtedly be increased materially before Jan. 1. There was, of course, no foundation for the statement that the Northern Steamship Co. would build two more big passenger steamers, but an order from the company for a couple of package freight steamers would not be surprising, as its freight business during the past season has been larger than ever before, necessitating the chartering of vessels from among the "wild" carriers. It is now said that plans of the Northern company in this regard provide for two new fast freighters, that would be used exclusively for through freight between Duluth and Buffalo. In connection with the report of new passenger vessels for the Northern line, it may be noted, however, that President J. J. Hill has not given up the idea of a faster service than is now afforded by either the North West or North Land. He is said to have talked of building another boat, and clings to the idea of a twenty-five mile service for the entire run between Duluth and Buffalo, although there are few people on the lakes who will agree with him that such a service can be made practical, on account of the disadvantages of connecting rivers. Prof. Biles, the English engineer who became famous as a designer of the Paris and New York, made a trip on the North Land during the past summer, and upon a request from Mr. Hill, who was with him on the trip from Duluth to the Sault, gave some thought to the question of a twenty-five mile boat for the line, but his conclusions have not been made public.

The Sheriffs Manufacturing Co. of Milwaukee has considerable important repair work under way. They are about to overhaul the wrecked engines of the steamer Laura, and it is probable that 36 feet will be added to the length of this vessel at Milwaukee, if she is not put into winter service. They are also putting package freight hoists into the steamer Mary Boyce, which is preparing for winter service. Another job at Milwaukee, in which they will participate, is a \$30,000 rebuild for the Anchor liner Conemaugh. Six Cleveland steamers, the H. A. Tuttle, Queen of the West, Siberia, R. R. Rhodes, J. W. Moore and Colonial, have of late been fitted with Sheriffs wheels.

Two new Scotch boilers, each 11 by 12 feet and of 170 pounds working pressure, will be built during the winter by the Cleveland Ship Building Co. for the Lake Superior Iron Co.'s steamer Joliet. The Cleveland Ship Building Co. has obtained from the Dry Dock Engine Works of Detroit the right to apply the Howden system of hot draft to new steamers which they may build or to steamers in which they may be making alterations.

The steel tow barges for which F. W. Wheeler & Co. secured a contract from the Bessemer Steamship Co. a few days ago will be a duplicate of the barge building for the same company by the Globe Iron Works Co. of Cleveland—388 feet over all, 46 feet beam and 26 feet moulded depth.

E. W. Heath of Benton Harbor, Mich., will build for the Lydon & Drews Dredging Co. of Chicago, a wooden tug that is to be 85 feet long, 20 feet beam and 11 feet depth, and to cost about \$17,000.

Association of Masters and Pilots.

An association that seems certain to grow on the lakes is the American Association of Masters and Pilots. Two or three new branches, or harbors as they are called, of this association were organized in leading lake cities last winter, and although this work was begun late, it was evident from the large membership recorded that the advantages of the organization, and especially its beneficial features, are appreciated. Leading officers of the Ship Masters' Association are interesting themselves also in the new organization (new to the lakes), which takes in the mates as well as the captains. An initial meeting for the coming winter of Cleveland Harbor No. 42 will be held next Tuesday evening at No. 94 Superior street.

Low holiday rates will be in effect via the Nickel Plate road on Dec. 24, 25, 31, and Jan. 1, 1897. Tickets will be good returning until Jan. 4. A splendid opportunity of spending Christmas or New Year's day with the home folks and friends. 407 Dec. 31

Why not avail yourself of the opportunity of visiting friends while holiday rates are in effect via the Nickel Plate road. Tickets on sale Dec. 24, 25, 31, and Jan. 1, 1897. Return limit Jan. 4. 408 Dec. 31

Consolidation of Treasury Bureaus.

The commissioner of navigation, Mr. E. T. Chamberlain, again makes a strong argument in his annual report in favor of consolidating the several bureaus of the treasury department that are directly connected with the shipping interests of the country. He says: "I have the honor respectfully to renew the suggestion, made in the reports of the bureau for 1894 and 1895, that bureaus and branches of the treasury service established to regulate and promote shipping be assembled under the immediate supervision of the assistant secretary of the treasury. This organization would secure prompter, more efficient, and more economical administration of the laws relating to the merchant marine and would at the same time afford the opportunity for concentration of energies in other branches of the department. The bureau of navigation, the marine hospital service, the bureau of immigration, the light-house board, the revenue cutter service, the steamboat inspection service, and the life saving service are now distributed and under the supervision of the three assistant secretaries of the treasury. Those officers are also charged with supervision of the customs and its numerous and intricate problems, with the supervision of the currency and its difficulties, with the supervision of the treasury's great system of accounts, and the various branches of administration intrusted to the department. In many matters, the co-operation of two or more of the marine bureaus is necessary, yet, short of the secretary of the treasury, there is no one officer authorized to recommend or take final action, the concurrence often of two and sometimes of the three assistant secretaries being necessary. Delay is thus at times inevitable, though unnecessary under the arrangement proposed. To carry out that arrangement, I have the honor respectfully to request that you renew your recommendation to congress for the appointment of an additional assistant secretary of the treasury to be charged with the supervision of the bureaus concerned with the merchant marine. The additional expense would be small, and it can be predicted that under such supervision retrenchment and increased efficiency would save many times over the salary involved. The plan has the further advantage that if it shall prove desirable hereafter to establish a department of commerce, similar to the British board of trade, with the machinery requisite to make such a department effective, the proposed treasury consolidation would furnish an organization already in working order from which such a department would be constructed."

Around the Lakes.

F. Kraus & Co. will build a grain elevator costing about \$15,000 at Grand Haven.

Ashland has shipped, in the twelve years since it was opened as an iron ore shipping port, just 17,000,000 gross tons of ore.

James Corrigan of Cleveland has sold for \$26,500 to other stockholders his interest in the steamer Centurion which had an original value of \$30,000.

Every fall for several years past the little schooner D. S. Austin is reported among vessels ashore on Lake Michigan. She went on the beach near Manitowoc a few days ago, but was released, probably to be heard from again next fall.

County officials at Ashtabula have overcome the efforts of the vessel interests to bring about the reconstruction of the swing bridge at that point. The order of the war department requiring certain changes in the bridge, so as to provide a better channel, has been revoked.

Burger & Burger of Manitowoc will rebuild the Goodrich steamer Muskegon, which was wrecked in dry dock at Milwaukee. She was bought in at auction in Milwaukee, Tuesday. The Goodrich company and the dry dock company will fight out at law their difference over the loss on the vessel.

Supt. Geo. W. Marr of the Portage lake ship canals favors the construction of breakwaters and improvements in piers at entrances to the canals on both sides of Keweenaw peninsula. He is preparing plans that will be passed upon by the war department as soon as possible in order to bring up the matter of appropriations in the next congress.

Whatever others may do, the Review will take the time necessary to prepare a complete and reliable list of vessels laid up at different ports around the lakes. Such a list is valuable mainly for reference purposes, and if prepared in a hurry, before the shifting of vessels from one port to another is at an end, it would be worthless, on account of doubt regarding its accuracy.

Only a Trifle Below Ten Millions.

ORE MOVEMENT BY WATER DURING 1896 AGGREGATES 9,657,921 TONS—RAIL SHIPMENTS WILL MAKE THE OUTPUT PRACTICALLY TEN MILLIONS—STOCKS ON DOCK HALF A MILLION GREATER THAN THEY WERE A YEAR AGO.

Official returns from dock managers at all ore shipping ports have been received by the Marine Review, and the shipments by water are found to foot up 9,657,921 gross tons, which is only 575,989 tons less than the shipments by water during 1895, the banner year of the industry. Figures covering rail shipments will not be available until the close of the year, but it is known that they will foot up about 300,000 tons, thus making the year's output, lake and rail, practically 10,000,000 tons. Escanaba is still the leading shipping port, but Two Harbors and Ashland are outstripped by Duluth, which moves up to second place with shipments footing up 1,988,932 tons. Another cargo or two, and Duluth would have passed the two million mark. The greatest loss as compared with last year is at Ashland, and the greatest gain is at Marquette, where two docks are now in operation. Shipments of the several ports during the five years past appear in the following table:

LAKE SHIPMENTS OF IRON ORE, GROSS TONS.

	1896.	1895.	1894.	1893.	1892.	1891.
Escanaba.....	2,321,928	2,860,172	1,644,770	2,048,981	4,010,585	3,058,590
Marquette.....	1,578,600	1,079,485	1,424,856	1,086,934	1,026,338	1,056,027
Ashland.....	1,566,336	2,350,219	1,738,590	1,117,520	2,223,683	1,261,658
Two Harbors.....	1,813,992	2,118,156	1,373,253	903,329	1,165,076	840,289
Gladstone.....	220,888	109,211	79,108	203,585	115,886	177,866
Superior.....	167,245	117,884	.....	80,273	4,245	.....
Duluth.....	1,988,932	1,598,783	1,369,252	440,292	.....	.....
Total by lake.....	9,657,921	10,233,910	7,629,829	5,880,918	8,545,313	6,444,440
Total all rail.....	.....	195,127	118,293	178,037	528,030	650,541
Total Shipments.....	.....	10,429,037	7,748,122	6,058,955	9,073,343	7,094,981

In the comparison by ranges, the Gogebic, as indicated by Ashland shipments, falls behind, and second place is taken by the Marquette range. As was the case in 1895, the Mesabi range is again far in the lead. In the following table the rail shipments are not included for this year, but they are not large enough in any case to change the order of ranges.

SHIPMENTS BY RANGES.

Ranges.	1896.	1895.	1894.	1893.
	Gross tons	Gross tons.	Gross tons.	Gross tons.
Mesabi.....	2,882,079	2,781,587	1,785,839	613,620
Marquette.....	2,473,051	2,097,838	2,049,107	1,835,893
Gogebic.....	1,698,956	2,547,976	1,834,086	1,329,464
Menominee.....	1,515,745	1,923,798	1,137,949	1,466,197
Vermilion.....	1,088,090	1,077,838	948,513	820,621
Total.....	9,657,921	10,429,037	7,755,494	6,065,795

RECEIPTS AND STOCKS AT LAKE ERIE PORTS.

Complete returns from all Lake Erie docks have also been received, and it is found that receipts at these docks foot up 8,026,432 tons, while the amount on dock Dec. 1 was 4,954,984 tons, or 539,272 tons more than was on dock at the close of navigation in 1895. Cleveland regains this year the first place as an ore receiving port, having received 2,313,170 tons, against 2,272,822 tons received at Ashtabula. Receipts at Buffalo show a marked falling off, and the loss at that port compared with 1895 would be even more apparent if the figures for Tonawanda and Buffalo were separated.

As shown by figures presented on May 1 of this year there was on dock at Lake Erie ports at the opening of navigation 1,949,698 tons of ore; add to this the receipts during the season just closed, 8,026,432 tons, and we have a total of 9,976,130 tons; deduct 4,954,984 tons, the amount now on dock, and we find that the shipments to furnaces between May 1 and Dec. 1 foot up 5,021,146 tons, against 6,339,496 tons during the same period in 1895 and 4,104,948 tons during the same period in 1894.

It will be noticed that there is a difference of 1,631,489 tons in the shipments from upper lake ports and receipts at Lake Erie ports. This difference represents the ore that was moved by water to South Chicago and other points on Lake Michigan, as well as a very small amount that is moved by water to Detroit each year. In 1895 the shipments to South Chicago and other points just referred to aggregated 2,121,682 tons, or practically half a million tons more than the shipments of this kind during 1896.

IRON ORE RECEIPTS AT LOWER LAKE PORTS, GROSS TONS.

PORTS.	1892.	1893.	1894.	1895.	1896.
Toledo.....	139,987	145,515	158,384	260,730	301,794
Sandusky.....	49,736	4,464	23,043	12,361	58,667
Huron.....	65,000	137,700	172,775	146,442	226,515
Lorain.....	190,400	165,667	150,424	214,219	191,445
Cleveland.....	1,950,224	1,260,716	1,624,573	2,312,370	2,313,170
Fairport.....	866,611	792,517	976,222	914,617	941,446
Ashtabula.....	2,555,416	1,845,738	1,987,722	2,474,791	2,272,822
Conneaut.....	1,190	203,207	237,905	244,967	327,623
Erie.....	645,230	469,299	654,438	811,989	847,849
Buffalo & Tonaw'da	197,000	308,238	395,339	719,742	545,101
Total.....	6,660,734	5,333,061	6,350,825	8,112,228	8,026,432

IRON ORE ON DOCK DEC. 1, GROSS TONS.

PORTS.	1892.	1893.	1894.	1895.	1896.
Toledo.....	71,409	92,911	96,157	113,132	115,959
Sandusky.....	87,500	78,439	77,004	34,375	59,491
Huron.....	45,000	89,000	147,632	101,000	200,075
Lorain.....	147,600	201,632	223,733	224,264	231,288
Cleveland.....	1,347,992	1,163,930	1,441,785	1,200,792	1,419,311
Fairport.....	610,609	578,033	660,980	605,470	773,905
Ashtabula.....	1,312,658	1,296,431	1,439,119	1,301,302	1,441,666
Conneaut.....	.....	91,337	199,365	292,460	275,800
Erie.....	401,683	359,827	454,233	335,718	355,222
Buffalo & Tonaw'da	125,000	119,170	94,239	207,199	82,267
Total.....	4,149,451	4,070,710	4,834,247	4,415,712	4,954,984

A mistake has been made in crediting the steamer Kearsarge with twenty-seven trips in the package freight trade between Buffalo and Duluth during the past season. She made twenty-four trips in the Buffalo-Duluth trade, carrying cargoes on up-bound trips on several occasions, and has just closed the season with an additional Lake Michigan trip, taking package freight from Buffalo to Milwaukee and Chicago and returning to Buffalo over the same course. The steamer Nicholas, another of the successful package freighters, also made twenty-four Duluth trips during the season, but she had some advantage in running to Erie instead of Buffalo, and she carried no cargo up the lakes. The steel steamer Gratwick, engaged in similar trade, made twenty-three Lake Superior trips and one Lake Michigan trip. She took a grain cargo from Chicago to Buffalo in the spring, then made twenty-three round trips between Buffalo and Duluth, and concluded the season with a return cargo to Chicago, where she is laid up.

Managers of the Cleveland & Buffalo and Graham & Morton passenger lines have managed to secure a liberal amount of free advertising in lake papers through their talk of building costly new boats during the winter. This is a part of the business of a successful passenger-boat manager. Both these companies are badly in need of new steamers, but neither of them have been in earnest about new boats to come out next spring. The Graham & Morton line managers have been figuring for a low charter on the City of Milwaukee, and the dispatches now announce that they have secured that boat for another year. With the Cleveland & Buffalo line the situation is different. They were ready to go ahead with plans for a new boat some time ago, but money matters were very uncertain before election and they could not arrange the financial end of the project. Now it is too late to get out a boat of the kind they want for next season, and if they were to undertake the work they would have a large amount of money tied up unnecessarily for several months. They must have another boat, however, and will undoubtedly let a contract later on for a steamer as good, if not better, than the City of Buffalo.

The story from Chicago about John D. Rockefeller putting up a big iron manufacturing plant at South Chicago is not worth denying, but there is considerable in the Carnegie-Rockefeller transportation deal for iron men and lake vessel owners to ponder over.

On and after Monday, Dec. 14, accommodation trains Nos. 18, 19, 20 and 21 between Cleveland and Lorain, via the Nickel Plate road, will be discontinued.
413 Dec. 17



DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, Ohio, by John M. Mulrooney and F. M. Barton.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, \$1.00. Advertising rates on application.

Entered at Cleveland Post Office as Second class Mail Matter.

The books of the United States treasury department on June 30, 1895, contained the names of the 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1895, was 360 and their aggregate gross tonnage 643,260.40; the number of vessels of this class owned in all other parts of the country on the same date was 309 and their tonnage 652,598.72, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

	Number.	Gross Tonnage.
Steam vessels.....	1,755	857,735.13
Sailing vessels.....	1,100	300,642.10
Unrigged.....	487	83,081.91
Total.....	3,342	1,241,459.14

The gross registered tonnage of the vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30, 1891.....	204	111,856.45
" " " 1892.....	169	45,968.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
" " " 1895.....	93	36,352.70
Total.....	347	335,433.98

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1895*	1894	1893	1895	1894	1893
No. vessel passages.....	17,956	14,491	11,008	3,434	3,352	3,341
Tonnage, net registered.....	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of navigation.....	231	234	219	365	365	365

* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about 1/4 per cent. of the whole, but largely in American vessels.

Since it has been quite generally understood that the local inspectors of steam vessels throughout the country are under civil service regulations, candidates for positions in the service have about given up hope of securing places under the new administration, excepting in cases where the local inspectors may be removed for cause. With the supervising inspectors, however, the conditions are different. Three candidates have already announced themselves for the position of supervising inspector in the ninth district, now held by Capt. Galvin of Buffalo. These are ex-Supervising Inspector McMasters of Buffalo, and Mr. Thomas Fitzpatrick and Capt. James Stone of Cleveland. Mr. McMasters held the position during President Harrison's administration. Mr. Fitzpatrick is a well-known vessel owner, who was among leading marine engineers on the lakes thirty years ago. He was inspector of hulls in Cleveland for several years. Capt. James Stone, commodore of the Bradley fleet up to a few years ago, has a record as a vessel master that is of a most successful kind. He is regarded as one of the ablest men who have ever been connected with ships on the lakes, and is a thorough gentleman. In the eighth supervising district, the only candidate as yet announced for the position held by Supervising Inspector Galwey is Capt. Charles H. Westcott, who also served under President Harrison. One point that will probably be made by vessel owners in connection with these appointments will be favorable to captains as against engineers. The vessel owners will try to have appointments made with a view to having an equal representation of captains and engineers in the board of supervising inspectors.

Great Britain now has ninety torpedo boat destroyers built or building, and it is expected that orders for ten more, of five knots more speed than the fastest now constructing, will be given out shortly. As some of the vessels already built have attained a speed of about thirty knots, it would hardly seem possible to add the five additional knots expected in the new vessels. Names selected for the ninety boats built or building are interesting. They are as follows: Albatross, Angler, Arab, Ardent, Ariel, Avon, Banshee, Bat, Bittern, Boxer, Brazen, Bruiser, Bullfinch, Chamois, Charger, Cheerful, Conflict, Contest, Coquette, Crane, Cygnet, Cynthia, Daring, Dasher, Decoy, Desperate, Dove, Dragon, Earnest, Electra, Express, Fairy, Fame, Fawn, Ferret, Fervent, Flirt, Flying Fish, Foam, Gypsy, Griffin, Handy, Hardy, Hart, Hasty, Haughty, Havock, Hazard, Hornet, Hunter, Janus, Kestrel, Leopard, Lightning, Locust, Lynx, Mallard,

Mermaid, Opossum, Osprey, Otter, Panther, Porcupine, Quail, Ranger, Recruit, Rocket, Salmon, Seal, Shark, Skate, Snapper, Spitfire, Star, Starfish, Sturgeon, Sunfish, Surly, Swordfish, Sylvia, Teazer, Thrasher, Violet, Virago, Vulture, Whiting, Wizard, Wolf, Zebra and Zephyr.

There is certainly nothing slow about Chicago. Renewed agitation at this time of the question of lowering tunnels under the river would indicate that it is the intention if possible to saddle this job onto the general government. The city government has repeatedly refused to undertake the expense of lowering the tunnels, and now it would seem that the attempt to divert government funds to purposes other than dredging has in view the lowering of the tunnels. The Chicago people will, of course, claim in this connection that the war department has taken charge of the river and is responsible for the maintenance of a channel suitable to the needs of commerce. If they are successful they will be credited with a shrewd game. Nobody will envy their success, however, as the improvement will be for the benefit of the entire lake marine.

When Mr. Rockefeller began to buy iron mines in the Lake Superior region two or three years ago, M. A. Bradley of Cleveland quit building vessels, and in discussing at that time the future of the vessel business on the lakes, he was heard to remark that "he thought he would lay low and see what the big fellows would do about investing in ships." He has since built no new vessels, and has given more attention to rents from Cleveland business blocks than to his vessel property. It is said that rents do not fluctuate like vessel freights. Mr. Bradley now suggests, in view of recent big combinations in the lake business, that he would like to trade any of the vessels of his fleet that are under 1,600 tons capacity for a ham sandwich.

The hydrographic office has published a new edition of sailing directions for the great lakes and connecting waters, revised and corrected to date. In this edition it has been thought best to present in one volume complete sailing directions for the lakes, leaving out the several articles of information useful to mariners, which appeared in the earlier editions. As this single volume covers the entire chain of lakes, and is issued by the government, it will undoubtedly take the place now of all publications of the coast-pilot kind, especially on account of the low cost of \$1 at which it will sell. This book may be had from the Marine Review.

The American Society of Mechanical Engineers, which has just held a general meeting in New York, honored, by election to office, several men who are well known to readers of the Review. W. R. Warner of the firm of Warner & Swasey, Cleveland, was elected president, and among the vice-presidents are S. T. Wellman of Cleveland, Engineer-in-Chief Geo. W. Mellville of the navy, Edwin S. Cramp and Past Assistant Engineer J. C. Kafer of the navy.

The ice jam below the dyke in Hay Lake channel, St. Mary's river, which was the cause of delay and expense to vessel owners during the past week, should receive attention from the government engineers. It is claimed that the jam was due to peculiar conditions of channels in the vicinity of the dyke, brought about by improvements that have been made of late at that point.

Since 1871 Germany's merchant marine has increased from 982,000 tons to 1,550,000 tons, or over 58 per cent. Of course the number of vessels is smaller, as the increase is all in large steamers. The aggregate tonnage of sailing vessels was 239,000 tons less in 1895 than it was in 1871, but the increase in steam vessels was from 1,043 tons to 893,000 tons.

A prominent English engineer declared at a meeting of one of the marine engineering societies in London recently, that an Atlantic liner to steam at the rate of thirty knots an hour would require to be a vessel of about three times the displacement of the Campania, with engines of about 120,000 indicated horse power and with a draft of about 45 feet.

It would seem that the builders of sea-going ships are also making big strides in the matter of longer vessels. Harland & Wolff, the famous ship builders of Belfast, Ireland, who have been leading the world in big cargo steamers, recently completed a slip on which they can build a vessel 700 feet long.

Trial of the Steamer Ranney.

Another test of a lake steamer fitted with Howden hot draft is presented herewith. This time the vessel is one of the older type of wooden steamers, the R. P. Ranney, owned by M. A. Bradley of Cleveland, and as she has compound engines, the results are not, of course, to be compared with the performance of modern steamers, but a consumption of only two pounds of coal per hour per I. H. P., under the conditions, is certainly remarkable. During the winter of 1895-96 the Dry Dock Engine Works of Detroit replaced an old

H. P. Spring 80

I. H. P. 297

M. E. P. 51.4 #

16139 #

L. P. Spring 10

I. H. P. 214

M. E. P. 7 #

11634 #

CARDS TAKEN NOV. 19, 1895, BUFFALO TO DETROIT.

Boiler pressure.....	120 lbs.	I. H. P., high pressure.....	297
Vacuum.....	23 ins.	I. H. P., low pressure.....	214
Revolutions.....	247	Total I. H. P.....	511
		M. E. P. ref. to L. P.....	16.6

fire-box in this steamer by a cylindrical boiler fitted with Howden draft apparatus, and also built new cylinders and renovated the engine. The trial was made under some disadvantages, as the steamer had been on fire in Buffalo, and while partially put in shape, there were parts of lagging and boiler covering off. It will be noted that two trials of the same length were made, with a single difference in the amount of steam carried. Results are practically identical.

Engines.—Compound, with cylinders 20 and 46 inches diameter by 48 inches stroke.

Boiler—One, cylindrical, 12 feet 6 inches diameter by 12 feet long; allowed 160 pounds steam pressure. Furnaces, two, 44 inches diameter by 5 feet 6 inches grate bars. Grate surface, 40½ square feet. Heating surface, 1,926 square feet. Ratio of heating surface to grate surface, 47.7.

Fan—Wheel diameter, 50 inches by 25 inches wide. Fan engine, 6 by 6 inches, vertical.

Propeller—11 feet 6 inches diameter by 13 feet pitch.

	First Trial.	Second Trial.
Steam pressure, pounds.....	140	120
Air pressure, inches.....	2	1½
Vacuum, inches.....	23	23
M. E. P., high pressure, pounds.....	55 1-3	51 2-5
M. E. P., low pressure, pounds.....	6.29	7.
M. E. P., ref. to L. P., pounds.....	16.8	16.6
I. H. P., high pressure.....	320	297
I. H. P., low pressure.....	194	214
I. H. P., total.....	514	511
Revolutions.....	76	76
Time of trial, hours, minutes.....	6:04	6:04
Coal burned, pounds.....	6,216	6,216
Coal burned per hour, pounds.....	1,025	1,025
Coal burned per hour per I. H. P., pounds.....	2	2½
Coal burned per hour, per square foot of grate surface, pounds.....	25.4	25.4
Ratio of horse power to grate surface.....	12.74	12.67
Ratio of heating surface to grate surface.....	3.74	3.77
Temperature of hot well, degrees.....	130	130

Iron Manufacturers Controlling Mines.

The acquisition of the Aetna, or Lowmore, mine on the Mesabi range by the Thomas Furnace Co. of Niles, O., suggests that the tendency is growing among furnace companies, to secure control of sources of ore supply. In the past season the Illinois Steel Co., which had some interest in a few minor properties some years ago, but produced little ore, has taken hold of two mines whose product is adapted to basic practice, and when the projected open-hearth plant at South Milwaukee is completed will draw upon red fossiliferous ores at Iron Ridge, Wis., which it has been developing of late. On the Masabi range, the Oliver and Lone Jack, Biwabie, Mahoning and Sellers properties end the greater part of their product to controlling consuming interests, while the Hale is under an exclusive contract to a furnace company. There are now but one or two properties on the range that are not either controlled by buyers of ore, or by one of the two great interests that own their own rail and water transportation lines. Speaking generally, the past few years have further emphasized the drift of the ore business either into consumers' hands or into those of strong companies, controlling railroads and vessels, and maintaining more or less close relations with furnace firms or steel companies. Through these various ramifying lines, the destination of a larger proportion than ever of the Lake Superior output, can be predicted with certainty before the opening of the season. The independent producer must have an especially desirable ore if he would thrive alongside this great web of interlacing interests.—Iron Trade Review.

Cargo and Speed Records—Lake Freight Steamers.

Iron ore—Coralia, Mutual Transportation Co. of Cleveland, 5,088 gross or 5,699 net tons, Gladstone to Ashtabula, draft of 16 feet 10 inches. From Lake Superior—Steamer Sir Henry Bessemer, Bessemer Steamship Co. of Cleveland, 4,637 gross or 5,194 net tons, Ashland to Conneaut, draft of 15 feet 9 inches.

Grain—Steamer Queen City, A. B. Wolvin of Duluth, 207,000, bushels of corn, equal to 6,210 net tons, Chicago to Buffalo, 16 feet 8 inches draft; steamer Maricopa, Minnesota Steamship Co., Cleveland, 191,700 bushels of corn, Chicago to Buffalo; steamer Zenith City, A. B. Wolvin of Duluth, 289,000 bushels of oats, Chicago to Buffalo. From Lake Superior—Steamer Queen City, A. B. Wolvin of Duluth, 156,256 bushels of barley and 58,000 bushels of wheat, equal to 5,490 net tons, Duluth to Buffalo.

Coal—Schooner Geo. N. Hartnell, 4,777 net tons of anthracite, Buffalo to Milwaukee, draft 15 feet 5 inches; S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone.

Speed—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 54 hours and 16 minutes, 16.4 miles an hour; Centurion, Hopkins Steamship Co. of St. Clair, Mich., Buffalo to Duluth, 997 miles, 65 hours and 10 minutes, 15.3 miles an hour.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, Dec. 5, 1896:

	Wheat, bushels.	Corn, bushels.
Chicago.....	14,051,000	4,606,000
Duluth.....	2,007,000	3,000
Milwaukee.....	368,000	3,000
Detroit.....	406,000	22,000
Toledo.....	1,060,000	309,000
Buffalo.....	2,972,000	531,000
	20,864,000	5,474,000

As compared with a week ago, the above figures show, at the several points named, a decrease of 697,000 bushels of wheat and 1,136,000 bushels of corn.

A chart of the whole of Georgian bay, the best thing of its kind as yet published, has recently been issued by the British admiralty, and may be had from the Marine Review, No. 409 Perry-Payne building. Another chart, of a very clear and interesting kind, taking in Lake Huron, Georgian bay, Lake Erie and connecting channels, has also been issued recently by the same authority.

A photograph of the largest boat on the lakes, the Sir Henry Bessemer, will cost you only \$1.50. Write the Marine Review.

Removal of Wrecks.

It is quite probable that the time allowed for the removal of wrecked vessels which have become an obstruction to navigation will be reduced from thirty to ten days by the present congress. Reports of both the secretary of the treasury and the secretary of war contain strong recommendations in this regard. The commissioner of navigation says in his annual report:

"The law concerning the removal of sunken vessels or wrecks which have become obstructions to navigation falls short of the requirements of the time and should be materially amended in the interest of safe navigation. This law may be found in section 4, chapter 11 of the act of 1880 (river and harbor act), as amended by the act of Aug. 2, 1882. This law provides that a notice of thirty days shall be given to all persons interested in such vessel and that unless the vessel is removed as soon as practicable thereafter, it shall be treated as abandoned and a derelict and the secretary of war shall remove the same. In the judgment of ship owners and others materially interested in navigation, the period during which a sunken vessel may thus remain an obstacle or peril to shipping is altogether too long. Many of our ports on the coasts and the lakes have wrecking and salvage plants which upon short notice can be moved to the scene of the wreck, and no hardship would ensue if the period of notice to the owner of a vessel sunken or wrecked and obstructing navigation were reduced to ten days. Even this change in the law will fall short of the advanced legislation of other nations on this subject. The best type of this legislation is the Thames conservancy act. That act authorizes the authorities created for the purpose in their discretion immediately to raise or destroy any vessel sunk or stranded in the Thames which has become a peril to navigation, and to charge the expense of such removal to the owners of the vessel. This act probably goes much further than it would be advisable to go at the present time in this country. If, however, the removal of sunken vessels dangerous to navigation is to be left to the owners, the law should require them to remove such obstacles at the earliest practicable day. The execution of the law is intrusted to the corps of engineers of the war department, and reference is made to the subject here solely in the interest of navigation and with no desire to trench upon the province of any other branch of the government. The matter, however, has enlisted the attention of the maritime interests and this bureau has been requested to co-operate, through the proper official channels, with those interests in securing remedial legislation."

Two new contracts for steel steam yachts are announced from the east. The Harlan & Hollingsworth Co. of Wilmington, Del., will build for George W. Childs Drexel of Philadelphia a yacht that has been designed by A. S. Chesebrough of Boston. She will be 150 feet 8 inches on water line, 170 feet 8 inches on deck, 24 feet beam and 14 feet 9 inches draught. Her engines will be of the triple expansion type, with cylinders 14, 22 and 36 inches in diameter, and 22 inches stroke of piston. The second yacht is to be 175 feet long and will be built by the J. N. Robins Co. of New York (Erie Basin) for Harrison B. Moore.

Death has removed two more well known vessel masters. Capt. Jams Fraezer, who was in the employ of the late E. M. Peck of Detroit for twenty-five years, and who was just before his death employed in the Huron line, Milwaukee, died in that city, Tuesday. He was sixty-three years of age. Capt. Wm. Neal of Bay City died suddenly of heart disease, aboard his boat, the Biwabic, at Ashtabula, Saturday. He was sixty-two years old and had lived in Bay City twenty-two years. He had been connected with the Mills Transportation Co. of Port Huron for twenty-three years.

Taking in old and new vessels, we now have in commission twelve big ships of the navy carrying names of states--Alabama, Illinois, Indiana, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, Oregon, Texas, Vermont and Wisconsin.

Reduced-rate tourist tickets to California points are now on sale by agents of the Nickel Plate road. Our trains make excellent connections at Chicago with through trains for the coast. 411 Dec. 31

Solid through trains between Chicago, Buffalo and New York city, and through sleeping cars to Boston, constitute the through service of the Nickel Plate road. Rates always the lowest. 412 Dec. 31

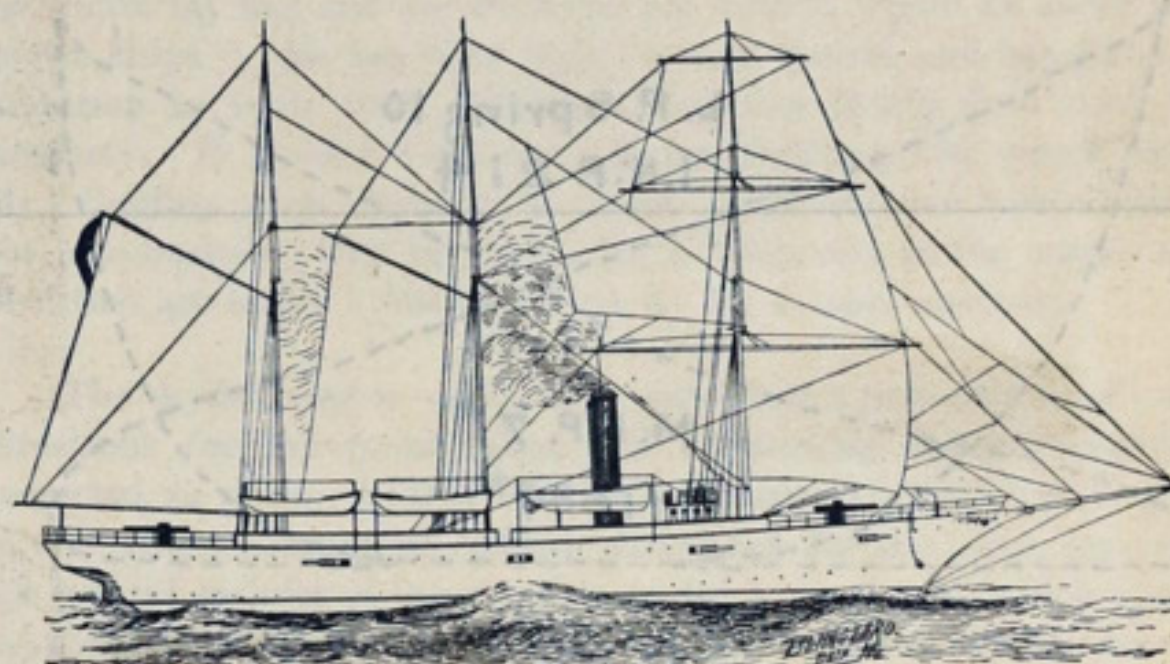
Trade Notes.

Peter L. Colon of Communipaw, N. J., will build for Brown & Fleming, No. 129 Broad street, New York, a tug that will be 107 feet over all, 23 feet beam and 10 feet hold.

At the annual meeting of the St. Louis yacht club, held a few days ago, F. H. Medart, well-known St. Louis builder of pleasure boats of all kinds, was elected rear commodore.

The ram or stem post for the battleship Kearsarge, building at Newport News, Va., is an immense open-hearth steel casting made by the Penn Steel Casting & Machine Co. of Chester, Pa. It weighs about 70,000 pounds. The metal was prepared at the Chester works in two open-hearth furnaces of fifty tons capacity each and poured from two ladles, each of twenty-five tons capacity, which are operated by electric cranes.

Bement Miles & Co., manufacturers of metal working machine tools, have just issued a supplemental catalogue calling attention to some of their standard machines and new designs. This company makes a specialty of tools for boiler, bridge, ship building and other shops where steel and iron plates are punched, planed, fitted and riveted. The Chicago office, 1534 Marquette building, will appreciate an opportunity to send out photographs or a description of any of their machines.



PLAN OF U. S. GUNBOATS VICKSBURG AND NEWPORT.

Vessels launched by Bath Iron Works, Bath Me., Dec. 5, 1896. Composite construction; 1,000 tons displacement at 12 feet draft; 168 feet long by 36 feet beam; cost, \$229,400 each.

Look at this! Three and one-half days to the coast! The Nickel Plate road makes the best connections with the fast trains for California. A through tourist sleeping car every Thursday. If low rates, fast time, and a comfortable trip are any object to you, drop a line to any agent of the Nickel Plate road, or to B. F. Horner, general passenger agent, Cleveland. 410 Dec. 31

The Nickel Plate road will discontinue trains 18, 19, 20 and 21 between Cleveland and Lorain on and after Dec. 14, 1896. 414 Dec. 17

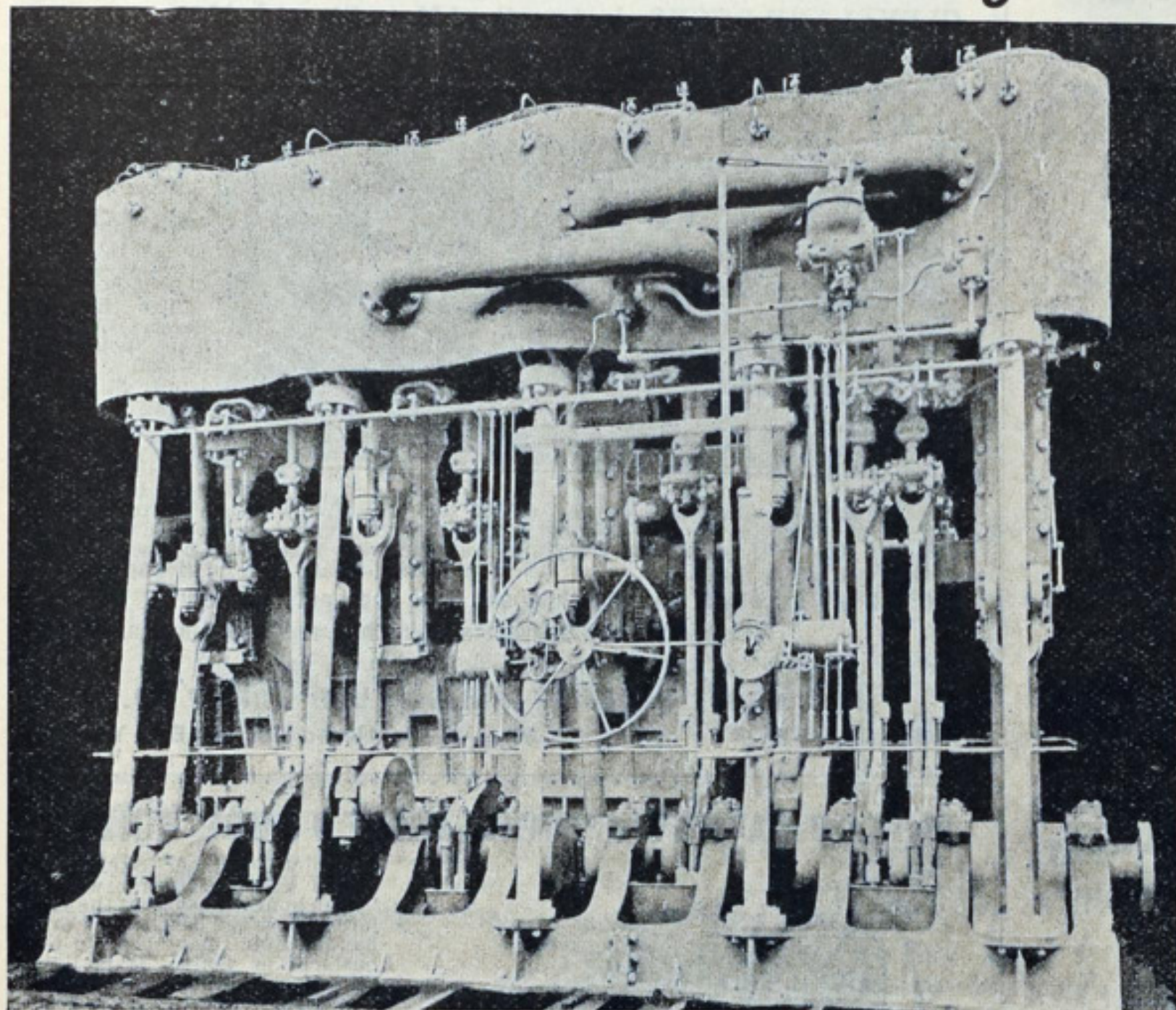
OFFICE OF THE LIGHT-HOUSE BOARD.

Washington, D. C., December 1, 1896. Sealed proposals will be received at this office until Wednesday, the 30th day of December, 1896, for furnishing the materials and labor of all kinds necessary for the construction, equipment and delivery of three first-class composite light-vessels and two steam tenders. Bids will be received for each vessel or class of vessel separately, or for all five of the vessels, all to be delivered on the Atlantic coast. An alternate bid will be received for one of three light-vessels, to be delivered at San Francisco, Cal. The said vessel or vessels must be completed and delivered within ten calendar months from date of the approval of the contract by the Secretary of the Treasury, and bidders are informed that because of the urgent need of the speedy delivery, the element of time to be consumed in construction will be given due consideration in determining the award of the contract, and in each case the contract will be awarded to the lowest best responsible bidder. Each proposal must be accompanied with a certified check payable to the order of the Secretary of the Treasury, in the sum of five thousand dollars (\$5,000). The certified check of the successful bidder will be retained until the execution of a formal bond or contract, and the approval of the same by the Secretary of the Treasury, and the certified checks of the unsuccessful bidders will be returned immediately after the proposals of the successful bidder have been accepted. Forms of proposals, plans and specifications showing what is required, can be had or seen by applying to this office. The right is reserved to reject any or all bids and waive any defects. JOHN G. WALKER, Rear-Admiral, U. S. N., Chairman. Nov. 3

A QUEER COINCIDENCE! THAT SERVE RIBBED TUBES AND ELLIS AND EAVES DRAFT

SHOULD BE IN THE BOILERS OF THE

Two Most Economical Cargo Steamers in the World!



ENGINES OF THE INCHMONA—

Hull, 325 feet long,
46½ " beam,
20½ " draft,

Engines, 17, 24, 34, 42 and 42 x 42 in. stroke.

THE BOILERS ARE FITTED WITH SERVE RIBBED TUBES AND THE ELLIS AND EAVES DRAFT.

This steamer carries 5,000 tons cargo, 9 knots an hour on a daily fuel consumption of 11½ tons coal. This amounts to 1.07 lbs. of coal per horse power per hour, over ½ pound less than the best showing made by any lake steamer with any kind of draft, and the lowest ever obtained in marine practice.

ENGINES OF THE KENSINGTON— (AMERICAN LINE.)

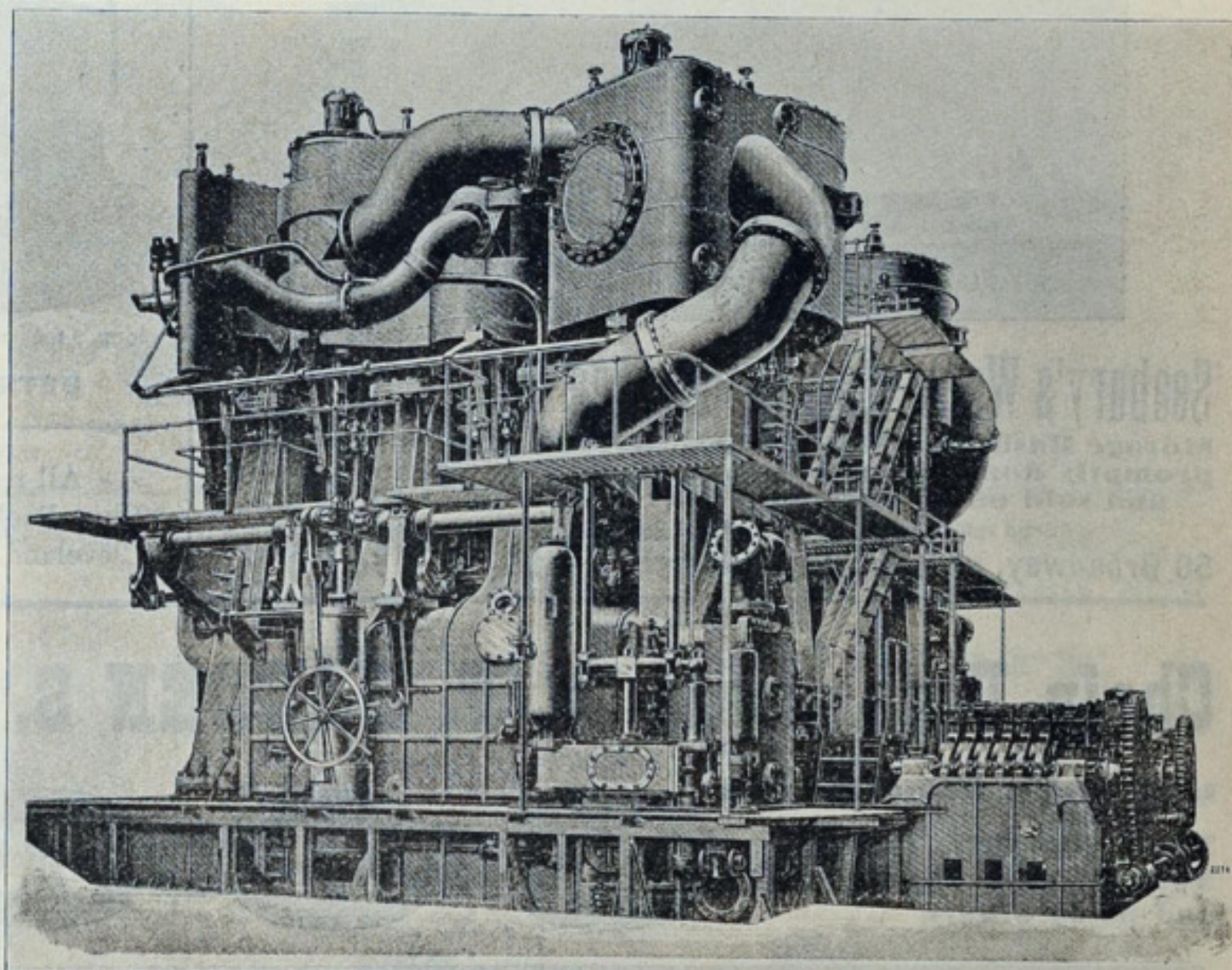
Hull, 480 feet long,
57 " beam,
40 " deep.

Twin Engines, 25½, 37½, 52½ and 74 x 54 in. stroke.

Boilers, Two Double-ended,
15 ft. 9 in. by 21 ft 5 in.
One Single-ended,
15 ft. 9 in. by 11 ft. 3 in.

FITTED WITH SERVE RIBBED TUBES AND THE ELLIS AND EAVES DRAFT.

Coal consumption per I. H. P. per hour on this steamer is 1.4 lbs. This is ¾ lb. less than the average lake steamer. Her cargo capacity is 10,600 tons.



Serve Ribbed Tubes and the Ellis and Eaves Induced Draft are to be installed in at least two lake steamers during the coming winter,—and it can be guaranteed that these steamers will have a fuel consumption as low as 1½ lbs. per I. H. P. per hour. A result of 1¼ lbs. has been obtained with the Ellis and Eaves Draft and Plain Tubes in the L. C. Waldo.

Owners of steamers contemplating repairs to boilers during the coming winter can learn how they can save the cost of the repairs in one season, by writing to

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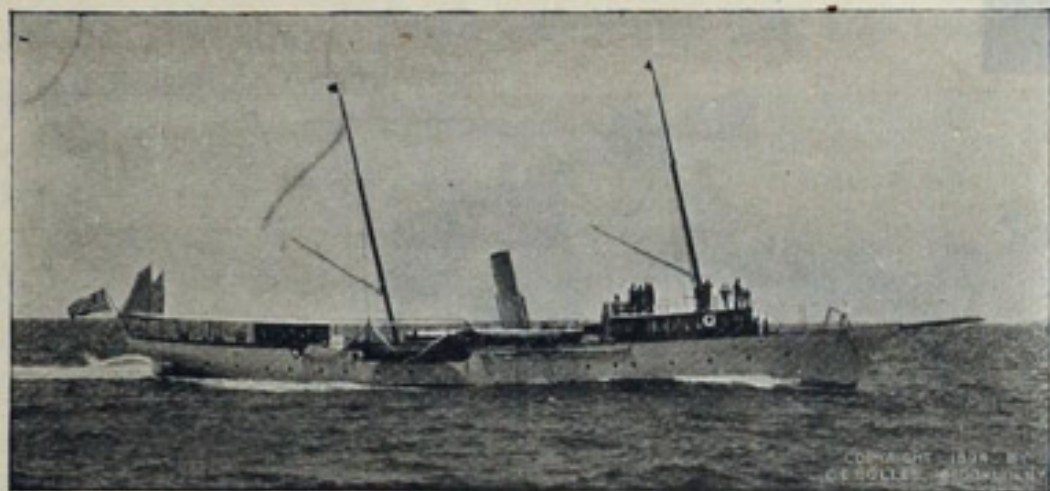
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Tube Boiler Co.,
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28th I am glad

to say that the boiler you furnished us for tug "ISLAY" is giving entire satisfac-
tion. I have heard no complaint about it whatever, but have heard a good deal in its
favor. I ride on the boat frequently and must say that I am much pleased with its
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THE ROBERTS BOILER is the Cheapest, Best and Lasts Longest.

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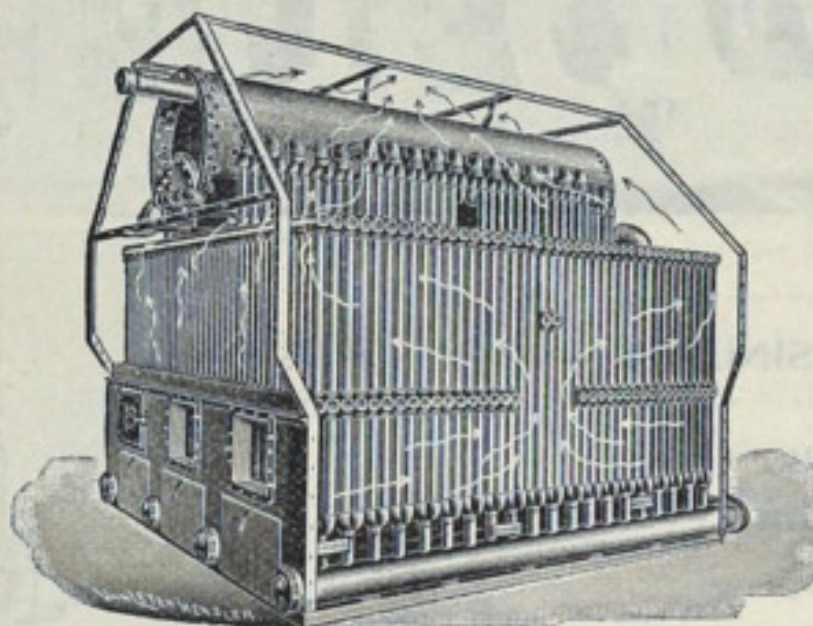
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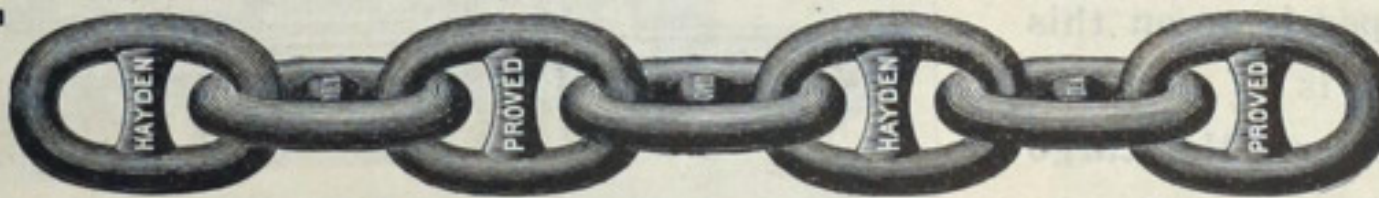
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The Taylor boiler is in the
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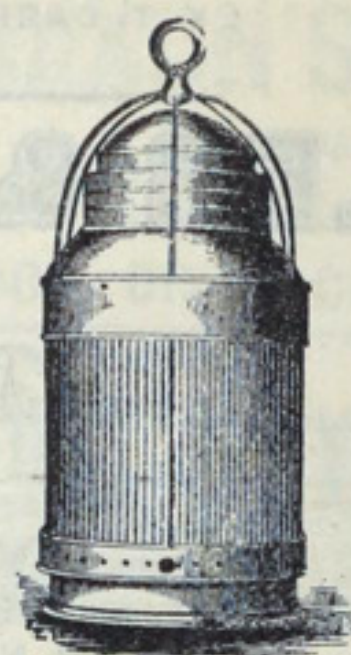
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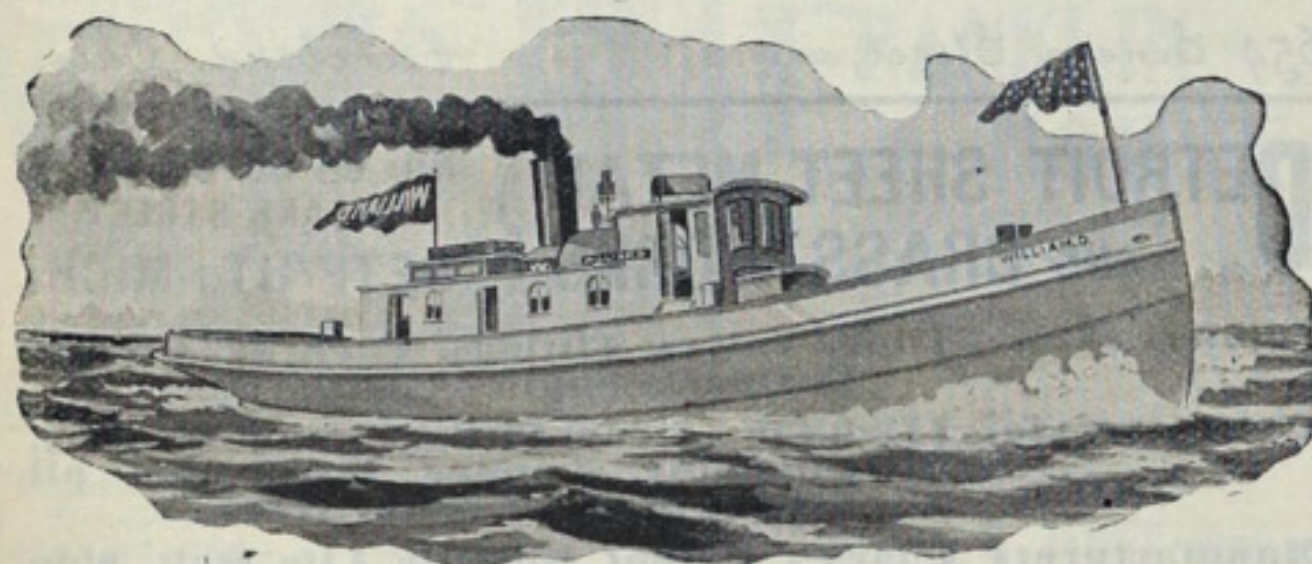
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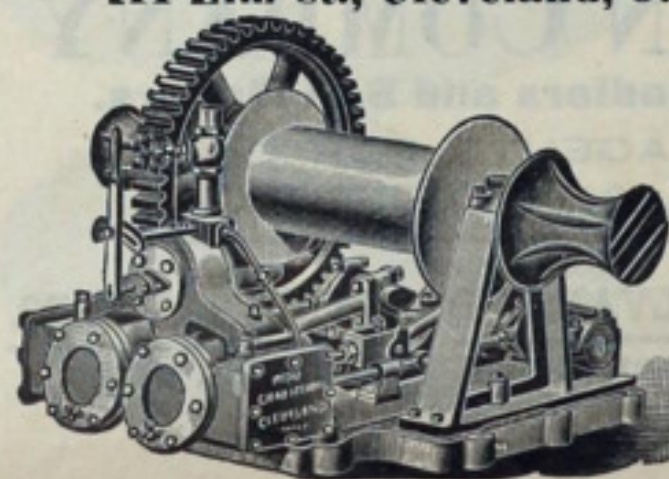
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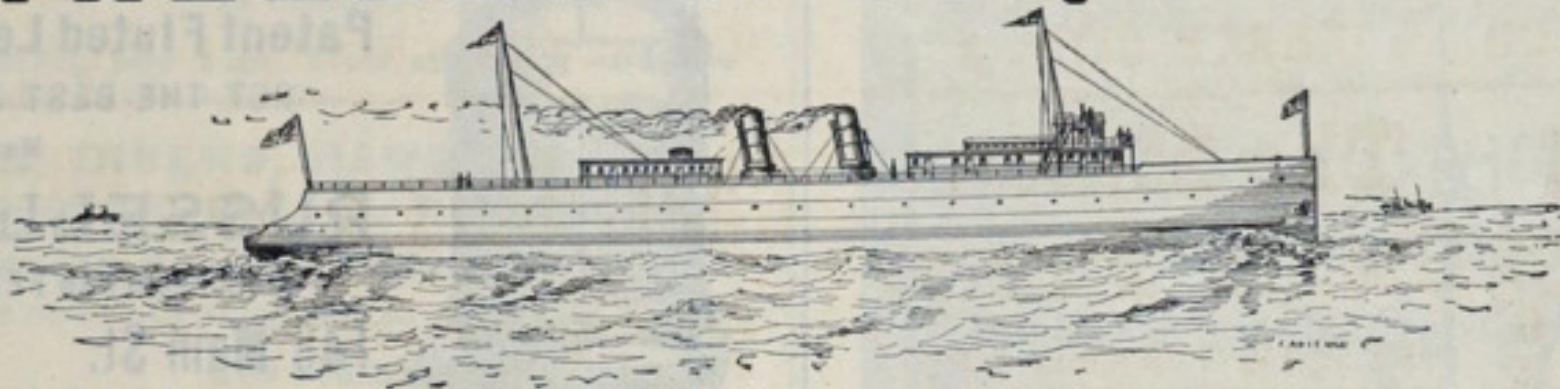
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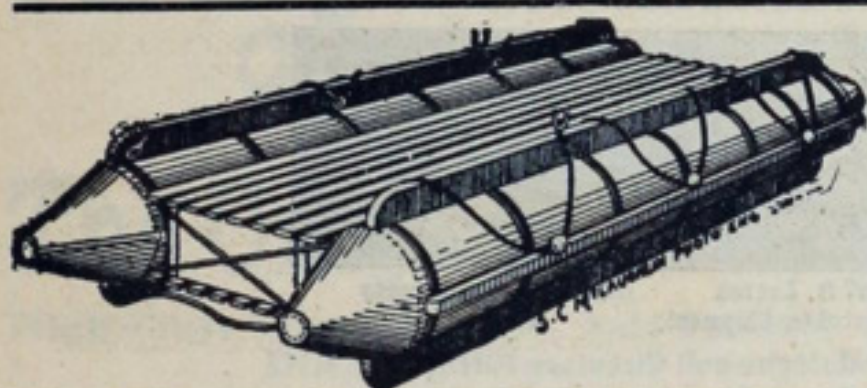
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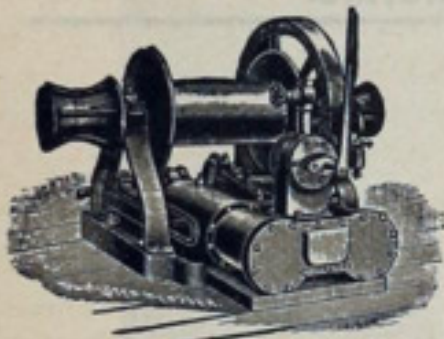
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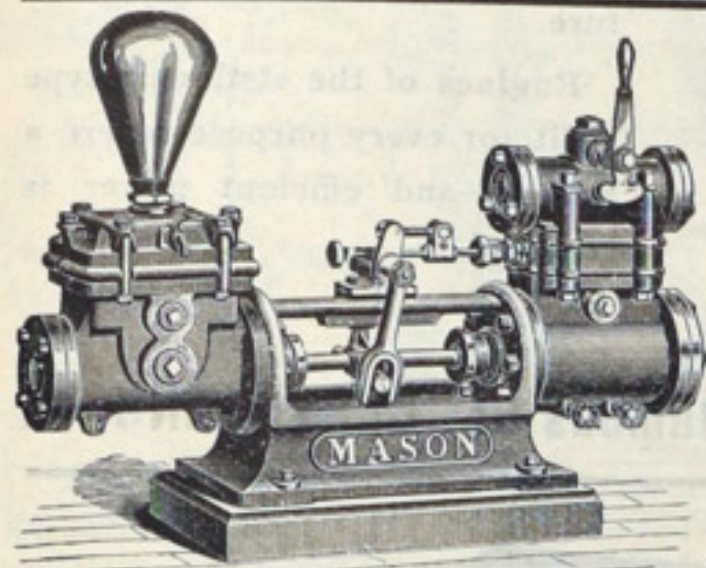
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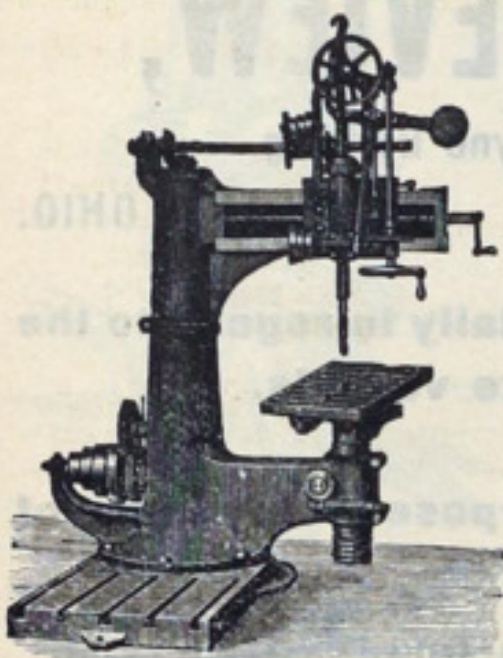
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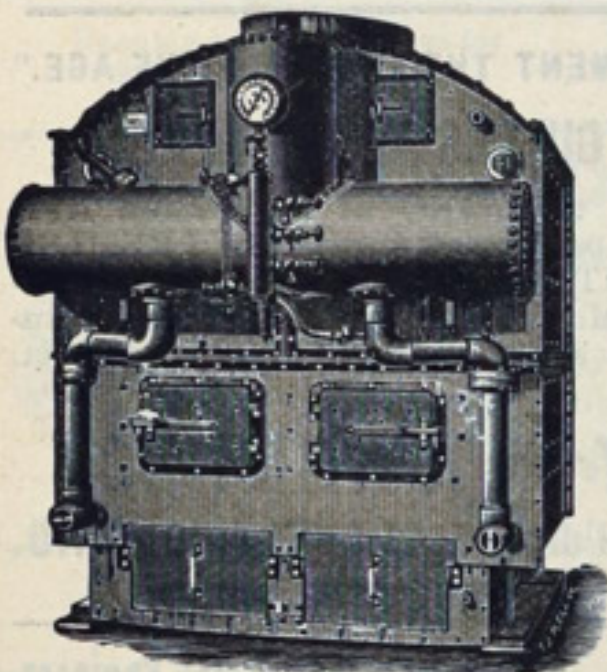
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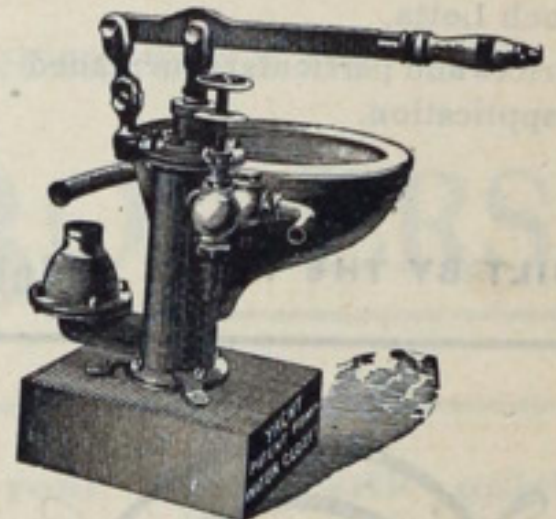
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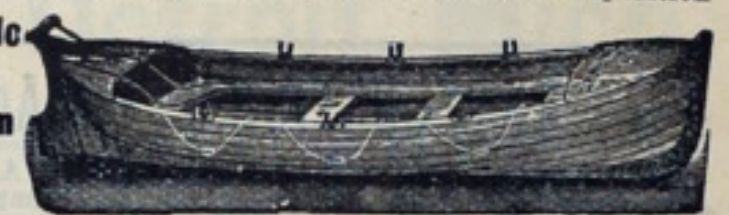
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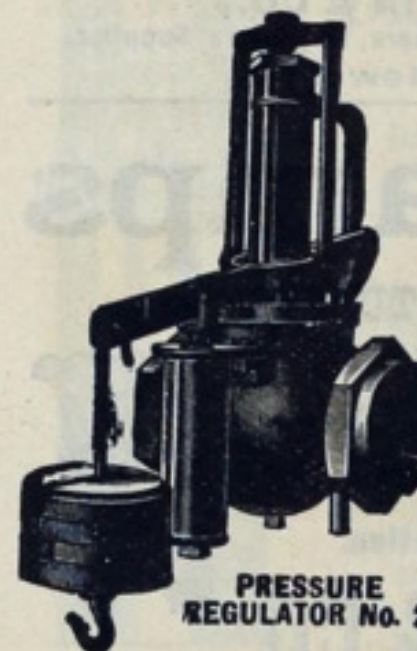
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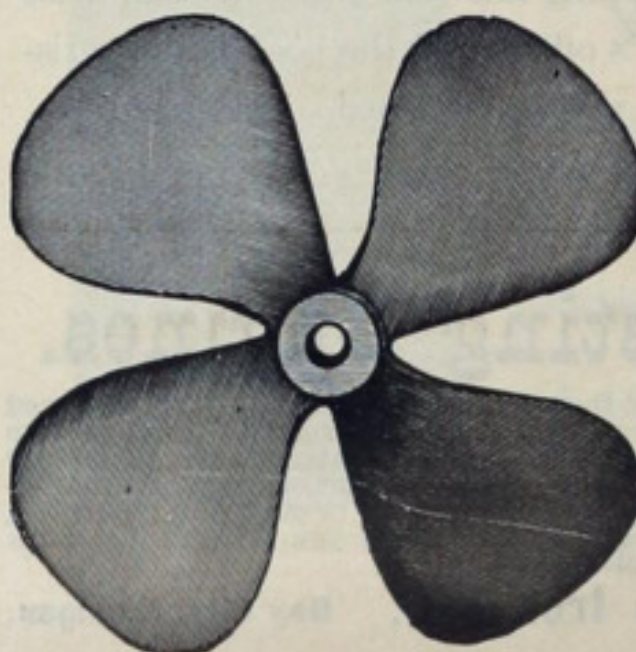
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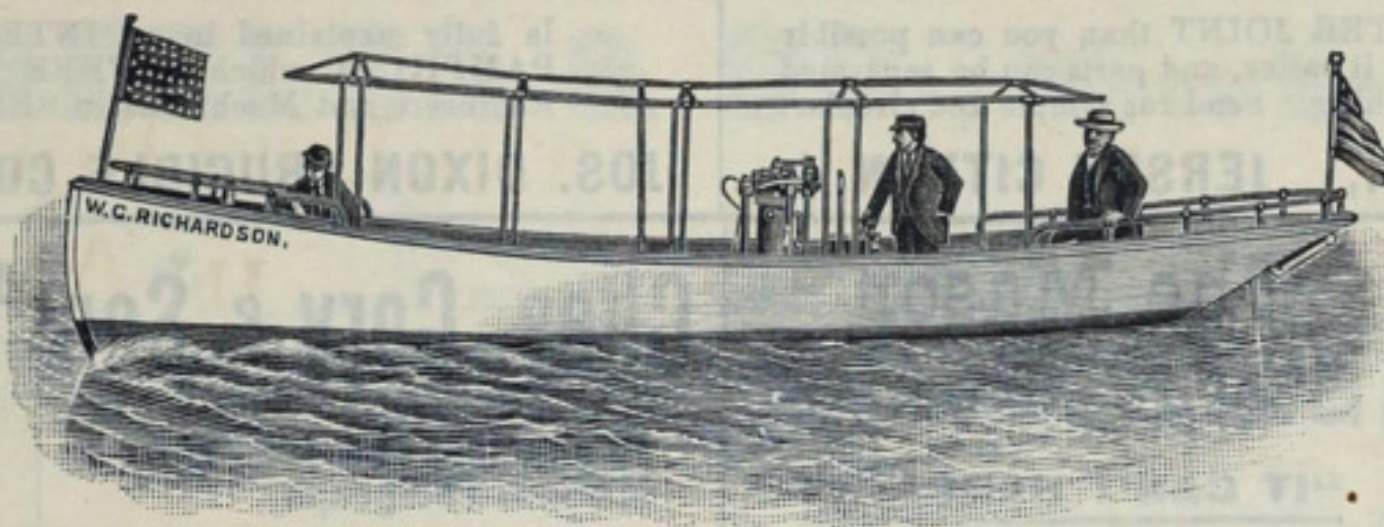


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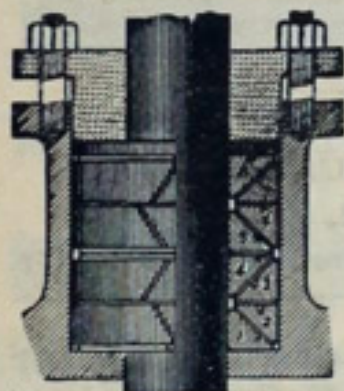
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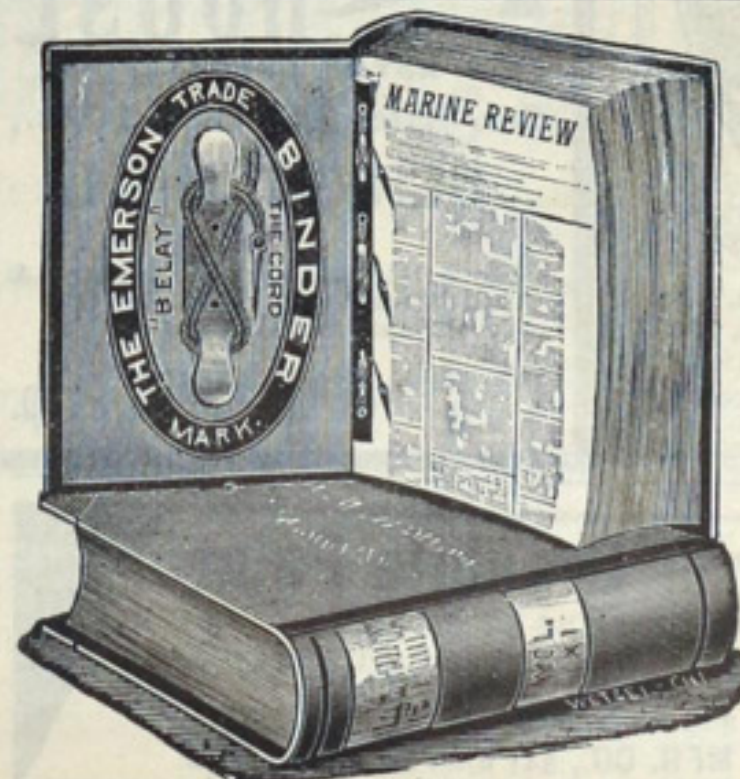


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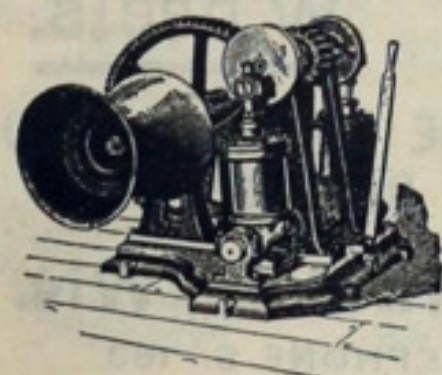
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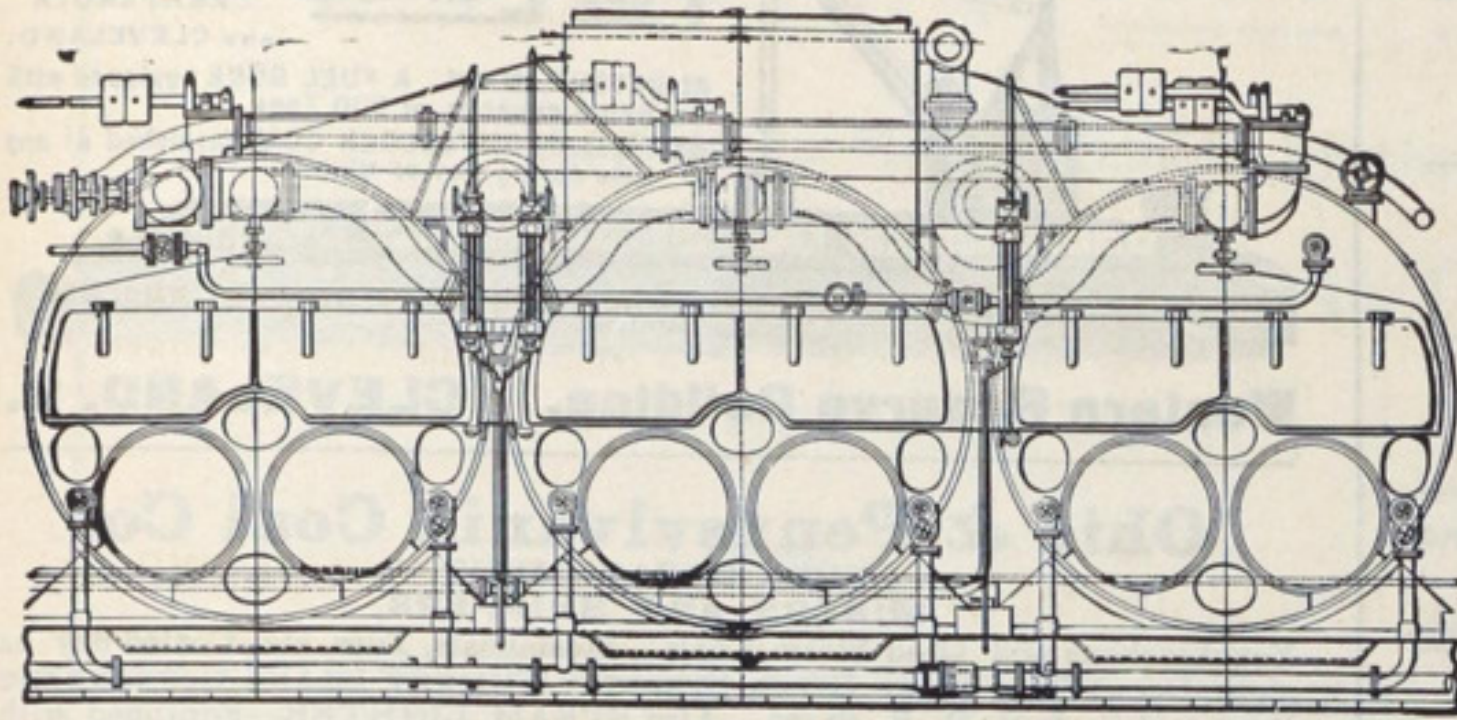


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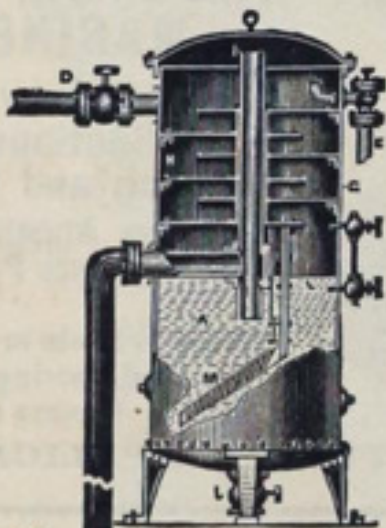
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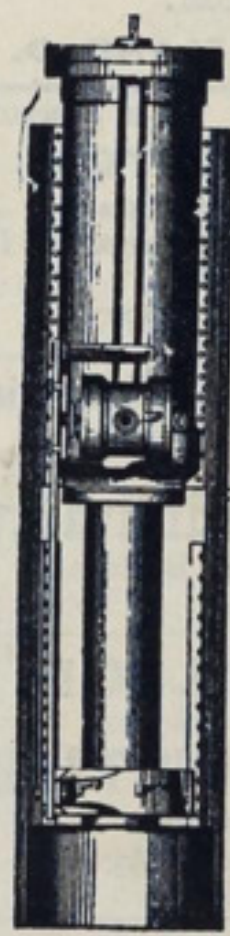
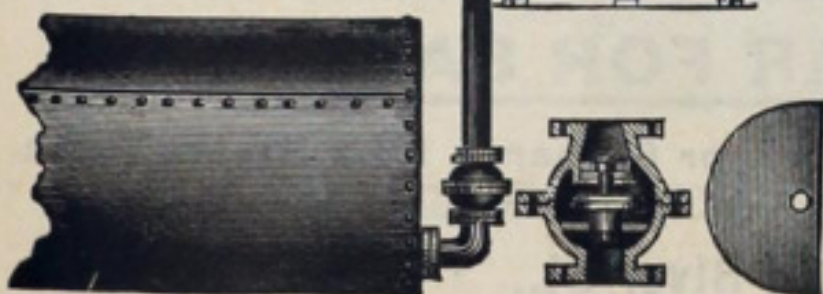
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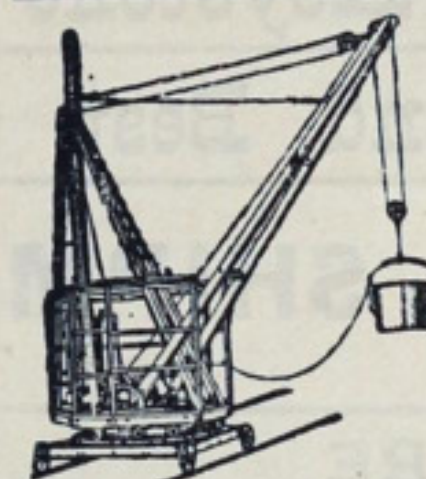
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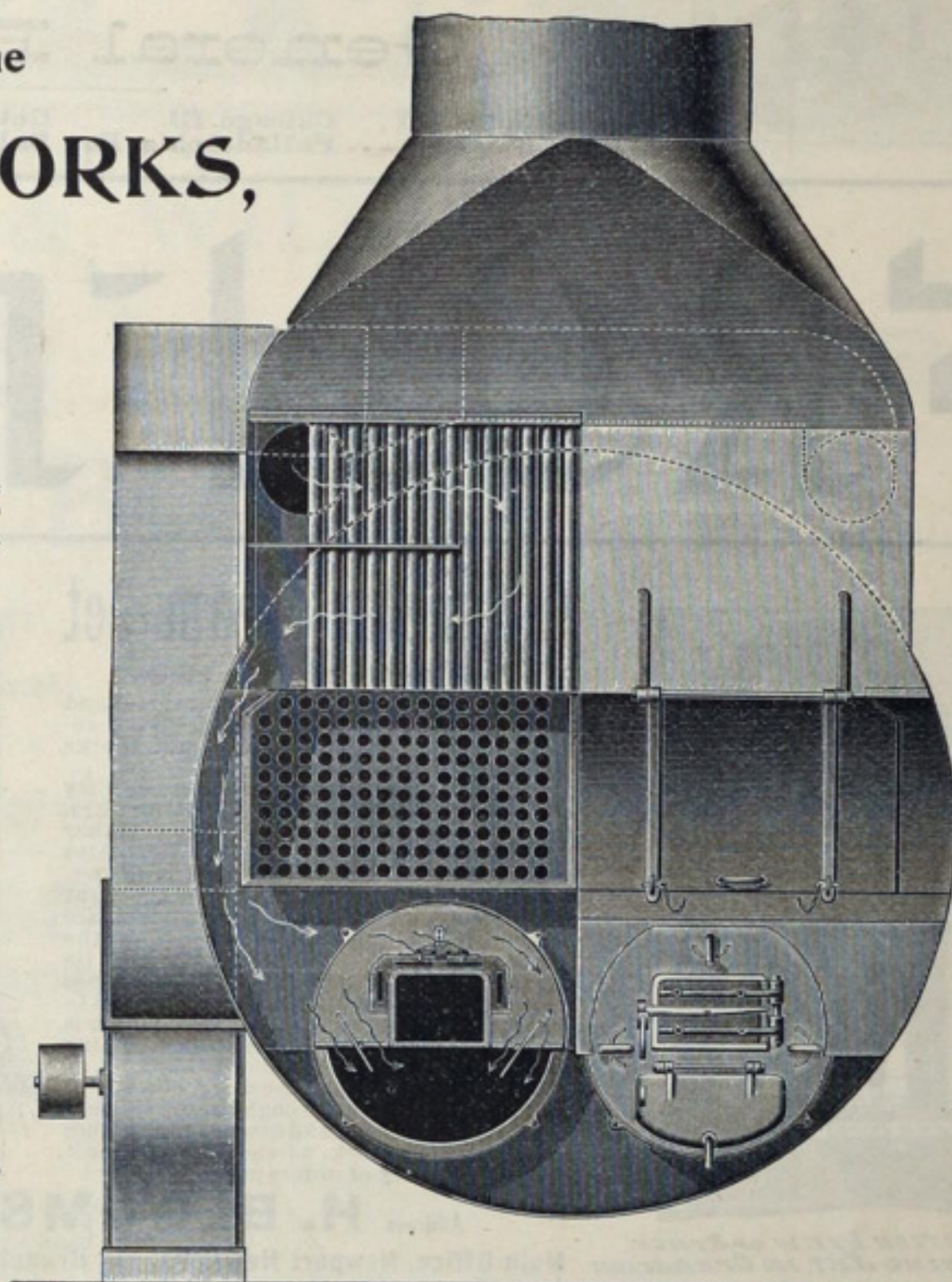
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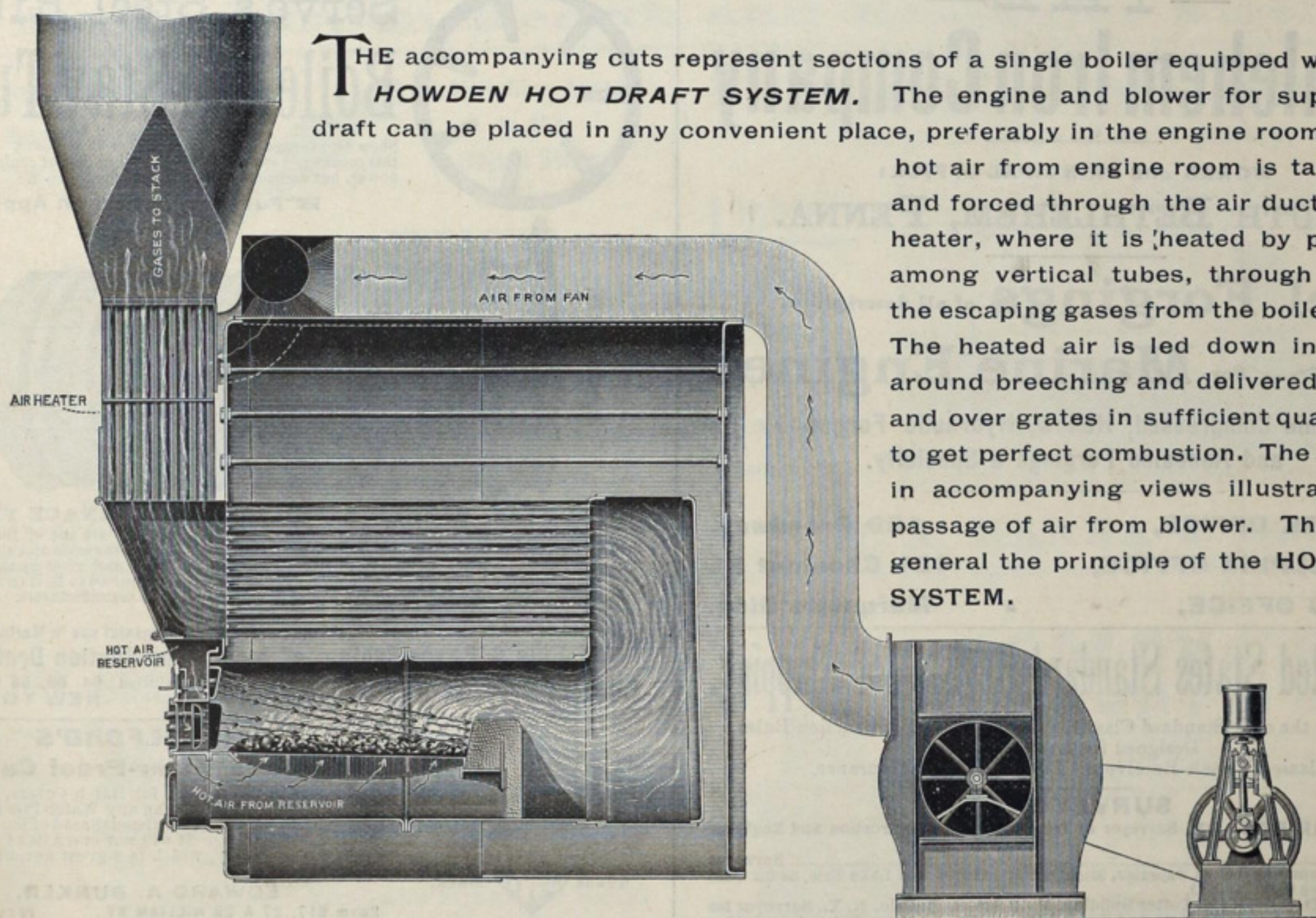
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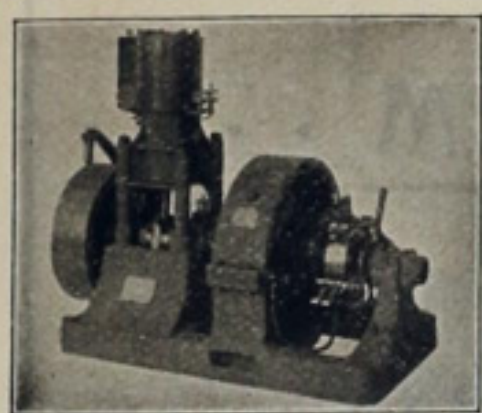


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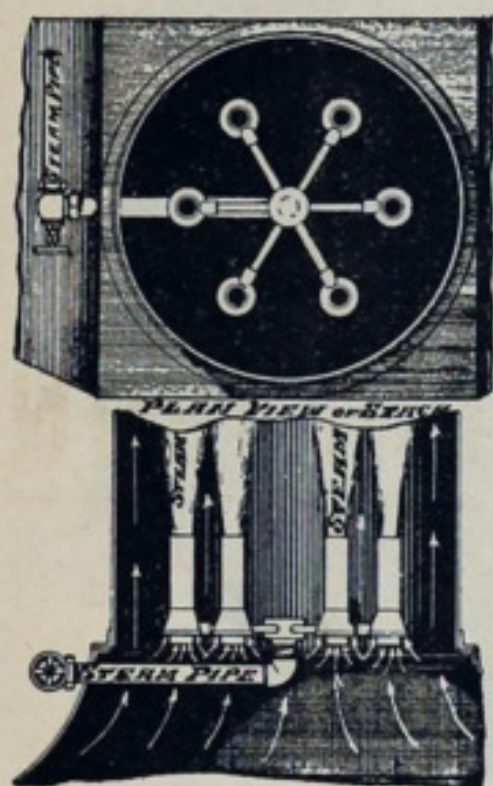
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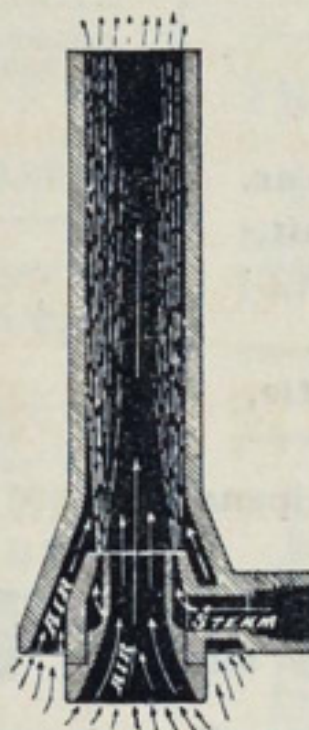
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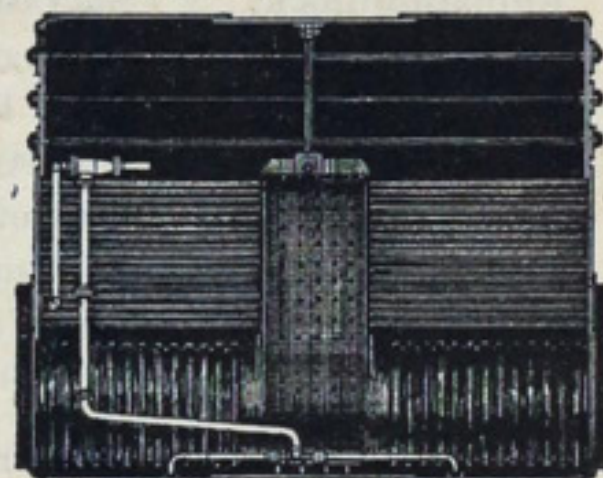
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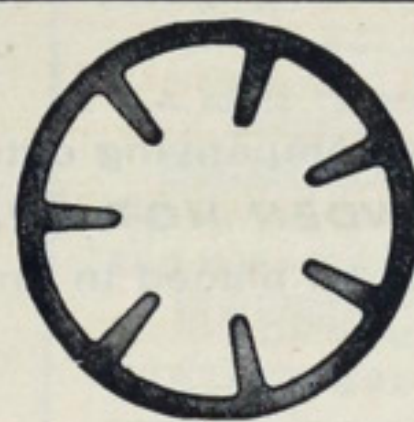
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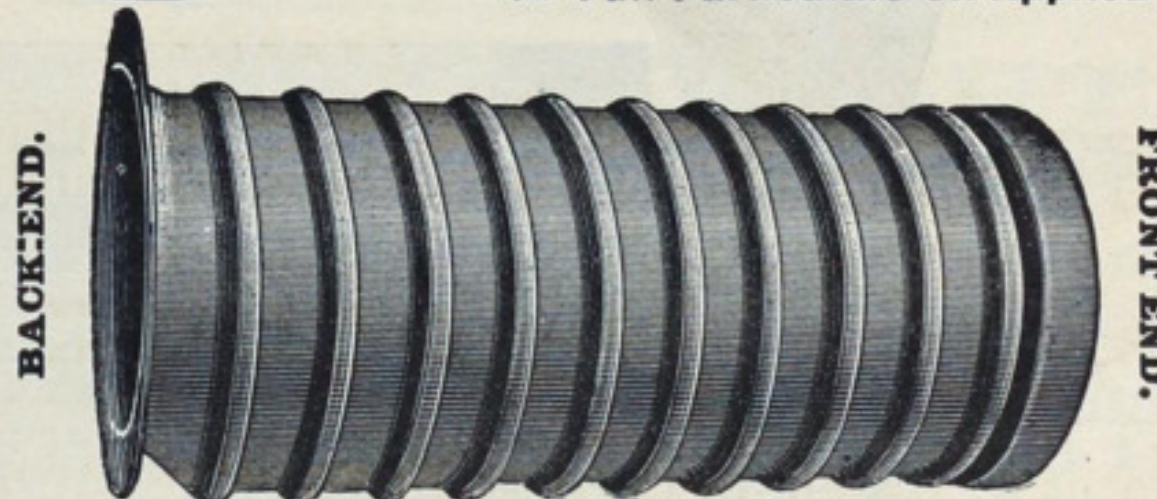
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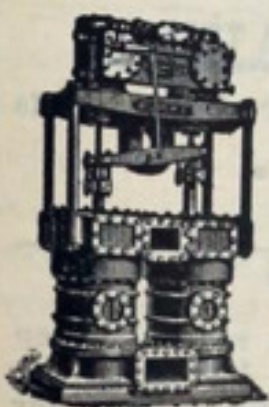
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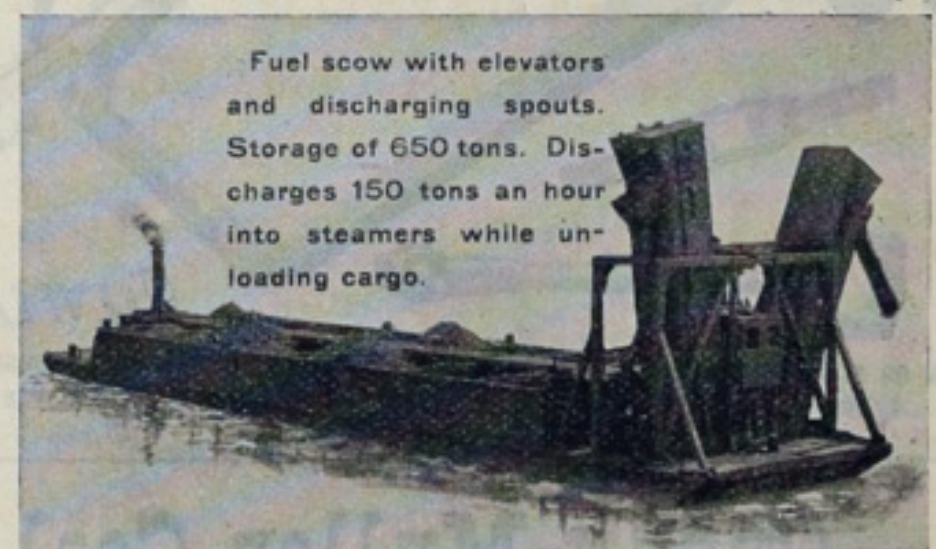
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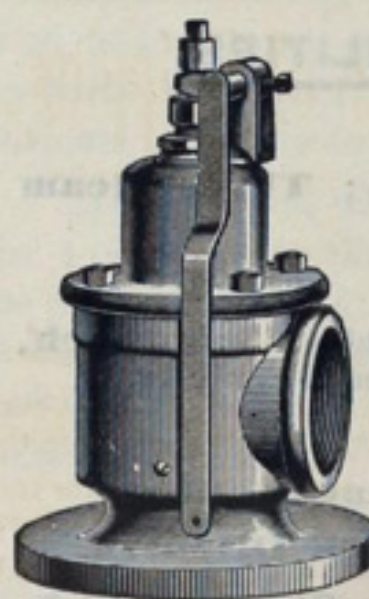
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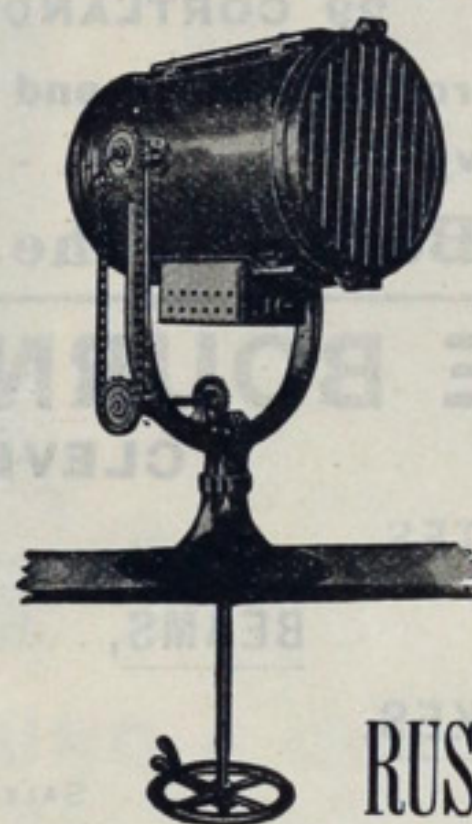
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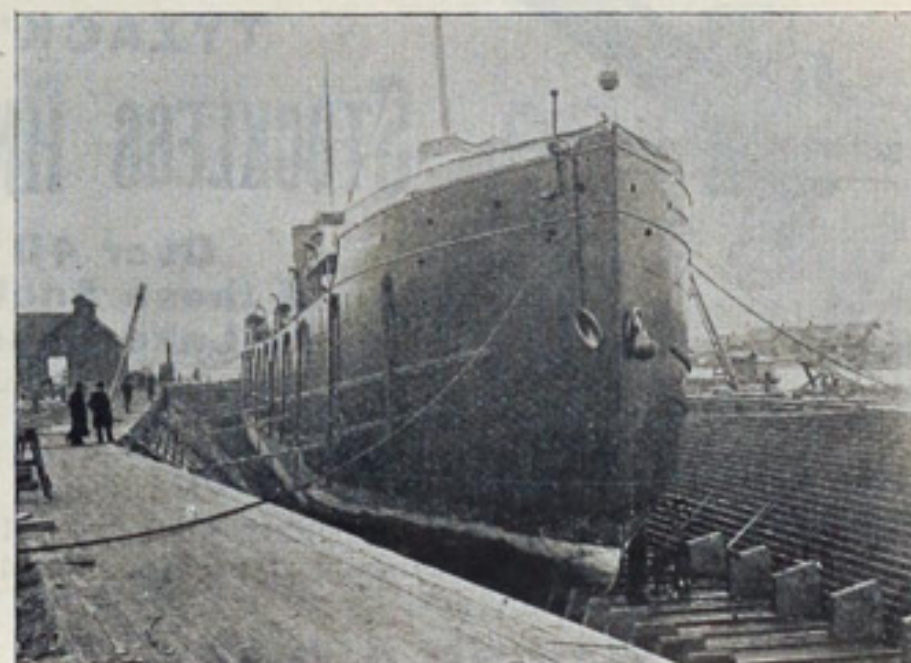
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